Commission canadienne des transports | Canadian Transport Commission

CANADA

SHOW CAUSE HEARING DECISION ON RAILWAY SAFETY

John T. Gray, Q.C.
Chairman, Railway Transport Committee

John Magee
Commissioner

J.F. Walter
Commissioner

September 30, 1981

Canadian Transport Commission
Railway Transport Committee
Ottawa K1A 0N9

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RAILWAY TRANSPORT COMMITTEE

Hull, Quebec
September 30, 1981

DECISION

IN THE MATTER OF the transportation of dangerous commodities by rail;

IN THE MATTER OF the recommendations contained in the Report of the Mississauga Railway Accident Inquiry submitted by the Honourable Mr. Justice Samuel G.M. Grange; and

IN THE MATTER of certain Orders issued by the the Railway Transport Committee.

File Nos. 50076.1
50076.1.1

Heard at Hull, Quebec, April 21 to June 26, 1981 and at Ottawa, Ontario, June 29 and 30, and July 1, 1981.

BEFORE:

John T. Gray, Q.C.	Chairman, Railway Transport Committee
John Magee	Commissioner
J.F. Walter	Commissioner

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1. BACKGROUND

1.1 The Mississauga Accident

On Saturday, November 10, 1979, just before midnight, a CP Rail freight train derailed at Mavis Road in the City of Mississauga, Ontario. Of the twenty-four cars that derailed, twenty-one were tank cars and nineteen carried dangerous commodities (chlorine, propane, toluene, and caustic soda). The first derailed car was a tank car carrying toluene. Fire ensued and three cars carrying propane exploded and caused considerable damage to neighbouring property. Chlorine was released from one tank car, and due to the fear of the consequences of that release, almost a quarter of a million people were evacuated from their homes and businesses for periods of up to six days.

Within a few hours following the derailment, the immediate cause of the accident was known to the railway and to the Canadian Transport Commission's staff. Clear evidence existed at the scene that a plain bearing on the toluene tank car had over-heated (in other words, had developed a "hot box") and had burnt-off resulting in the derailment.

Journal burn-offs are caused by overheating of the bearings. The almost universal cause of the over-heating of a plain bearing is the lack of lubrication of its components. Over-heating can arise for a number of reasons including improper maintenance or inadequate inspection. Nevertheless, even with the substantial effort made since the incident, no one has been able to prove specifically what brought about the failure of the plain bearing which caused the derailment at Mississauga.

1.2 The Mississauga Inquiry

Immediately after learning of the derailment the Railway Transport Committee (RTC) decided to convene, commencing December 4, 1979, a public hearing at Mississauga, Ontario to inquire into the derailment and the results thereof. This intention was made public by RTC three days later. In the meantime, public demands were made on the then Minister of Transport, the Honourable Don Mazankowski, for the convening of an independent inquiry, outside the Canadian Transport Commission, into the same occurrence. On

December 4, 1979, the Minister of Transport announced the appointment of Mr. Justice Samuel G.M. Grange of the Supreme Court of Ontario (hereinafter referred to as Grange J.) to conduct the necessary inquiry. The basic terms of reference of that inquiry included the requirement to report on the contributing factors and causes of the derailment at Mississauga and the steps which can be reasonably taken to reduce the risk of recurrence of such an accident anywhere in Canada.

The Grange Inquiry commenced on February 4, 1980 and the hearing of evidence and argument ended some eight months later, after 23,594 pages of testimony were heard and 687 exhibits were received. The bulk of the evidence consisted of an account of events leading up to the accident, the accident itself, the post-accident activities and the regulatory system which applies to railway operations.

Grange J. submitted his "Report of the Mississauga Railway Accident Inquiry" (the Grange Report) to the Honourable Jean-Luc Pepin, Minister of Transport and on January 19, 1981, it was tabled in the House of Commons. The report contained fifteen recommendations for the technical improvement of railway safety. These recommendations were made without hearing detailed evidence related to the economic aspects of safety measures and so without in-depth consideration for the economic impact of the recommendations' implementation. In this regard, Grange J. stated in his report: "...there is a limitation that my consideration and the Report are substantially restricted to the lessons of Mississauga." Indeed, considering the nature of the accident and the circumstances it entailed, the Committee has nothing but praise for the way in which Grange J. dealt with this most difficult matter.

The first three recommendations of the Grange Report dealt with: a) roller bearings and the nature of equipment forming a train carrying dangerous goods; b) hot box protection; and c) dangerous goods train speed and length restrictions. These recommendations were linked in the Grange Report by making the third recommendation an option in case either the first

or second recommendation could not be fully implemented. They were clearly major and were further singled out by Grange J. for immediate implementation, an urgency not given to the other twelve recommendations.

1.3 The "Show Cause" Hearing

One week after the Grange Report was tabled in the House of Commons, the Railway Transport Committee issued an Order to all railways under its jurisdiction in response to the urgency stressed by Grange J. (see Appendix 1). The Order addressed the issues raised in his first three recommendations. Twenty-three railways (see Appendix 2 for names of these railways) were ordered to "show cause" on or before February 9, 1981, why the RTC should not, effective February 12, 1981, order that:

> "1. If a train transporting any commodities regulated under the Regulations for the Transportation of Dangerous Commodities by Rail (hereinafter called the "Red Book") has:
>
> (a) any cars in it without roller bearings;
>
> (b) any tank cars carrying any commodity regulated under the Red Book that does not have double shelf couplers;
>
> (c) any specifications 112 or 114 tank cars carrying any commodity regulated under the Red Book that does not have head shields and thermal protetion; or
>
> (d) any 111 or 114 tank cars carrying any commodity regulated by the Red Book which have bottom fittings without bottom fitting protection;
>
> the train shall not exceed 4,000 feet in length.
>
> 2. If a train transporting any commodity regulated under the Red Book meets any of conditions (a) to (d) specified in clause 1, the train shall not exceed twenty-five miles per hour while passing through any centre of population containing 500 or more people in proximity to the track.
>
> 3. If a train transporting any commodity regulated under the Red Book:
>
> (a) passes through a centre of population containing 500 or more people in proximity to the track; and

> (b) the track through such centre of population does not have hot box and dragging equipment detectors installed at least every twenty miles,
>
> the train shall not exceed twenty-five miles per hour while passing through the centre of population."

In response to the "Show Cause" Order, the RTC received many detailed submissions containing evidence and argument against placing this Order into effect on the given date. The Show Cause Order was opposed in numerous railway submissions and also in submissions made by many non-railway intervenors who claimed that they would be adversely affected. In consideration of the substantial concern shown and numerous arguments raised, the RTC decided to hold an open hearing in which all parties could present evidence and argument regarding implementation of the Show Cause Order. Since only those opposed to implementation of the Show Cause Order had initially responded to it, the hearing was intended to allow all interested parties, both for and against implementation, to fully present and argue their case in a public forum.

The RTC "Show Cause" Hearing dealing with these issues commenced on April 21, 1981 and terminated on July 1, 1981. It involved 5,063 pages of testimony and argument. This decision is a result of that hearing. However, before presenting an analysis of the evidence, arguments and representations, the Panel considers it essential to highlight certain information and thoughts on the nature of its deliberations and to place the subject three Grange Recommendations in their proper perspective.

2. A GENERAL PERSPECTIVE

The Mississauga accident received nationwide and in fact worldwide publicity probably as much because of the successful evacuation of approximately one quarter million people as of the nature of the accident itself. The accident included post-accident spectacular fires and explosions, but there have been a number of similar or more spectacular accidents which have taken place in the United States during the last ten to twelve years. The mass evacuation without loss of life or serious injury, on the other hand, was unique in world experience. The Mississauga accident suddenly made all Canadians aware of the potential which exists for the occurrence of a major rail accident involving dangerous commodities with its attendant risk to human life and health. The public awareness of this possibility gave rise to an outcry for public investigation of railway safety in general and brought about the Grange Inquiry as well as the present inquiry of the Railway Transport Committee.

The lessons of Mississauga were well defined in the Grange Recommendations and concerned certain technical ways of improving railway safety. However, the Committee must weigh the benefits of implementing those lessons on a national scale, in light of the economic realities of Canadian society and of the possible adverse implications to other aspects of railway safety.

The Railway Transport Committee, like other Committees of the Commission, is bound by the policy directives set out in Section 3 of the National Transportation Act. Included in the prescribed policy is the direction that in carrying out its statutory duty the Railway Transport Committee should foster competition, at least where such competition is economically feasible. In imposing safety programs on the railways under its jurisdiction, the Committee must therefore have regard to their probable cost and their effect on the competitive position of the railways vis-a-vis other modes of transportation. This National Transportation policy also prescribes as objectives protection of the interests of the users of transportation and maintenance of the economic well-being of Canada. It declares that an economic, efficient and adequate transportation system

making the best use of all available modes of transportation at the lowest total cost is essential in meeting these objectives. These statutory objectives also point out the requirement to ensure that interchange of commodities, development of industry and export trade are not unduly obstructed.

Clearly, the Committee is required to examine the Grange recommendations and indeed any proposed rail safety action from many more perspectives than those of a single interest group or company and from more perspectives than the technical or physical aspects of safety improvement. The need for the Committee to consider all of these dimensions of the problem was aptly described by Grange J. as the Commission's "dilemma".

The Panel will be dealing with the specifics of the subject three Grange recommendations in detail later herein. At this stage, the Panel makes the general observation that the immediate implementation of these recommendations, as they were written, would cause the railways to make very large expenditures which would be passed on to dangerous commodity shippers, railway - dependent industries and eventually to the consuming public. More specifically, the Panel notes that one measure of the potential impact is demonstrated, for example, by the fact that anhydrous ammonia is a chief fertilizing element upon which nearly every farmer in Canada is dependent. Similarly every pulp and paper mill in Canada requires a steady and timely delivered supply of chlorine, a dangerous commodity shipped almost exclusively by rail. The potential exists clearly for damaging the railways' competitive position with the trucking industry in some cases and making the railways non-competitive in others. As well, the secondary impact of these expenditures holds the potential for disrupting industrial development and trade, thereby influencing the level of employment and the national economy.

2.1 <u>Public Safety</u>

The protection of the public involves protection from some risk and risk is by its nature a matter of more or less likely possibilities. The possibility of eliminating all risk of railway accidents exists only in closing down all railways — an option that no one seriously supports. This is not to say that all hazards can be casually ignored just because

some risk-taking is inevitable, but that taking extravagant measures to reduce each and every risk is not sensible. As well, reducing risks by one means in one area may increase costs greatly without reducing risks overall. The prudent course is one which balances the benefits of net safety improvement against the costs necessary to achieve the improvement, taking into account the public perception of what level of overall risk is acceptable.

It is also necessary to consider that in the public mind the acceptability of risk can vary with the type of risk and so affect the level of precaution deemed necessary. Perceptions of the relative dangers of different courses of action are not always logical. A statistically high risk of grave injury would appear acceptable to most where there is an element or an illusion of personal control but not where anonymous forces may act. For instance, people who chain-smoke cigarettes could still be eager to obtain vaccinations against swine flu. Significantly, people will take great alarm about events that rarely occur but may involve a number of people at once, yet the public seems to have less concern for incidents which occur very frequently though claiming only one victim at a time. An airplane crash (which occurs relatively infrequently) generates demands for huge investments in new safety devices while the same investment in teaching emergency treatment for heart attacks may save many more lives.

The Panel concludes that, in light of these considerations, to impose a tax on one sector of the economy in order to attain an anomalously low risk relative to the general risk accepted by the public in every day life does not make sense. Hence, the evaluation of the probable level of safety improvement arising from implementation of various possible actions is of utmost importance. The Panel also concludes that it is in the public interest to look beyond the Grange recommendations for other options that may yield the results intended but at lower cost.

2.2 The Value of Statistics

To evaluate objectively the risk of hazard to the public and the probable reduction of that risk through implementing new regulations, the Panel must rely, in part, on statistics and this can pose difficulties. In

reviewing accident related statistics involving railways (and indeed anything else), one should always keep in mind that statistics are only of value if a measured happening recurs sufficiently often to give the statistical prediction validity and meaning. Valid statistics can tell us the probability of something happening in the future based on the frequency of occurrence of the same happening in the past (all other things remaining constant). Statistics are of little value in predicting a happening which is only a remote possibility, it having occurred very infrequently in the past (or not at all). Many catastrophies are possible. Unfortunately, infrequent events with horrendous results are not always statistically predictable to the point where society can fully plan for or remove the risk.

The most logical approach to reducing the number of derailments is to put priority of effort and expenditures on those causes which statistically have given rise to the greatest percentage of derailments and that is what the panel in this decision will take into account. One should not be too exclusive though, because there are other possibilities for improving safety than reducing the number of derailments. Not to be forgotten are improvements to rail cars to make them more derailment or puncture proof, and the avoidance of accidents other than derailments such as collisions between trains and between trains and automobiles. The Panel believes that the only valid approach to railway safety is an overall approach trying to make meaningful improvements across the whole field and not going overboard in one option while ignoring or downgrading another.

In this context, it is useful to point out the past record of railway accidents according to their different causes. Burn-offs of bearings, and particularly plain bearings, are not the predominant cause of derailment accidents, let alone of all railway accidents on Canada's major railways. For instance, over the last five years, RTC data indicates that less than 10 percent of train derailments on CN Rail and CP Rail were caused by burn-offs of plain bearings, while track conditions accounted for about one-third of all derailments.

Recognizing the importance of track conditions to rail safety, the RTC has taken a number of measures in the past including not only the normal accident investigations and the more formal investigations under section 226 of the Railway Act, but also track inspection programs and maintenance of relevant statistics. A new improved track safety program is now being implemented with the additional staff recently made available to RTC.

2.3 The Costs and Benefits of Railway Safety Improvement

The cost of damages and of disruptions in railway operations may be reduced by safety measures and these cost savings can reduce the economic significance of capital investments for safety improvement. As well, there may be additional benefits from precautions taken solely to reduce accident risks if these precautions produce efficiencies in other areas which result in long term economic or social benefits. The prudent balance cannot, however, be struck through the application of simple quantitative cost and benefit equations.

To begin with, measuring costs is complex. These costs include money spent on precautionary measures to achieve a certain level of freedom from risk. They may represent massive capital investments. Whether or not the economic impact is burdensome or even crippling can depend as much on the period of time over which the investment is made as on its total magnitude. The true costs of these precautions are then difficult to determine.

The benefits associated with particular precautions to reduce the number or severity of accidents are even more difficult to estimate than are their costs. One aspect of benefit is increased assurance of human health and life. The objective value of these is difficult if not impossible to quantify. Another benefit is money saved which would otherwise be spent to rectify damages resulting from accidents. This includes damages to companies, individuals and the environment. Whether life or property is concerned, however, the amount and type of savings can be assessed only on a probabilistic basis and there is no complete agreement as to how these probabilities are to be calculated.

A number of witnesses suggested that it was not possible to put a value on human life. Others inferred that no expenditure was too great if it would lessen danger or risk to human life. It is not an especially pleasant topic for discussion, but the fact is that a value is put on human lives regularly and in most walks of life. Judges daily put a dollar value on human life and human suffering. Actuarial tables of a number of businesses are based on the valuation, for their purposes, of human lives. When highway authorities decide that traffic levels do not justify a divided highway, they have implicitly placed a value on human life. There is no doubt that a divided highway is safer than a highway with two way traffic. Nonetheless, the value of safety and human lives is not sufficient to justify the expenditure for every highway in the country. Every summer, countless Canadians die in boating accidents. The number could be reduced by more stringent safety rules more actively enforced. However, all the responsible agencies have their budgets, and the level of safety and the level of loss of lives in the boating field depends on how much money is available. Indeed, there are probably few fields of human activity which do not involve some practical compromise between safety and expenditure.

The Panel therefore concludes that the scientific and numerically exact evaluation of all costs and benefits of safety improvement actions is not possible. Balancing the scale requires not only the best attempt at quantifying all aspects, but also the addition to the scales of the weight of non-quantifiable issues, in the light of related expert opinion.

2.4 How Safe are Canadian Railways?

It appears to the Panel that the best method of determining the present relative position of rail services, as far as safety is concerned, is to review the available performance statistics of major Canadian railways with those in the United States. This is not to disregard the importance of the many smaller railways, but rather reflects the fact that the major systems have by far a greater proximity to population centers. In this regard, an accepted measure of safety performance is the number of accidents realized per million train-miles of service.

CN Rail and CP Rail have for a number of years stood at the head of major Class I North American railways and have compared well with most other smaller North American railways in terms of their safety records. CN Rail presented as evidence a comparison of safety records since 1976 between CN Rail, CP Rail and sixteen U.S. major Class I railways selected by CN Rail. Compared to these sixteen systems, CP Rail and CN Rail have consistently ranked in the top three.

COMPARISON - SAFETY PERFORMANCE
NORTH AMERICAN MAJOR CLASS I RAILROADS
(FRA REPORTABLE ACCIDENTS PER MILLION TRAIN MILES)

	1976	1977	1978	1979	1980
Baltimore and Ohio Railroad	15.0	23.0	18.3	18.8	18.77*
Chesapeake and Ohio Railroad	15.4	16.8	15.0	15.6	15.7 *
Consolidated Rail Corp.	12.7	15.1	17.6	14.4	13.19
Norfolk and Western Railway	7.7	7.5	7.4	5.9	6.44
Illinois Central Gulf Railroad	23.2	22.5	24.4	20.4	13.79
Louisville and Nashville Railroad	25.3	25.0	26.7	16.4	14.02
Seaboard Coast Line Railroad	17.7	22.5	19.2	12.9	11.32
Southern Railway	13.0	12.1	12.1	10.1	9.51
Atcheson Topeka and Santa Fe	4.9	5.7	5.9	6.1	6.42
Burlington Northern Inc.	12.5	11.4	13.0	12.4	11.17
Chicago North Western	35.8	35.0	35.0	30.1	28.06
Chicago Milwaukee St. Paul & Pac.	27.8	31.5	36.4	26.6	27.34
Missouri Pacific Railroad	6.0	6.3	5.9	7.8	9.20
Southern Pacific Transportation Co.	10.5	12.1	14.4	14.5	19.88
Union Pacific Railroad	8.3	7.4	9.4	8.1	6.83
Western Pacific Railroad	13.1	15.0	15.3	15.7	14.77
Average of Above	15.51	16.80	17.25	14.73	N/A*
Canadian Pacific Railway	6.57	4.97	5.22	4.71	5.34
Canadian National Railway	7.57	6.94	6.51	6.89	5.23
CP Rail Rank**	2	1	1	1	2
CN Rail Rank**	3	3	3	3	1
Average of all U.S. Class I Rlys.	12.9	13.6	14.9	12.6	N/A
Average of all U.S. Railroads	13.2	14.7	15.0	12.8	N/A

* Figures not available - average of last 4 years
** Note: ranking is with the selected 16 major Class I U.S. systems - not all Class I systems in North America.

Source: Exhibit CN-31

Assuming that taken as a group North American railways are all reasonably safety conscious, well managed and operated, one could conclude from these statistics that Canadians by and large are fortunate to have major railways which are among the best in North America. One could also conclude, at first glance, that no major safety-related initiatives or expenditures are therefore justified at this time. On the other hand, assuming that North American railways as a group are not reasonably safety conscious, well managed and operated, the statistics could merely indicate the performance of a mediocre group and that the Canadian railways are somewhat better than average. Which of these two assumptions is correct is not an easy matter to determine. All the Panel can conclude is that the Canadian public seems to face less risk presently and in the recent past than the public in the United States, as far as railway accidents are concerned.

From another point of view, the risk of hazards from railways should be placed in the context of other risks that the public face and generally accept. What relative risk does the average Canadian run of being killed or injured by the release of a dangerous commodity from a train following a derailment compared to the risks involved generally in modern society? The available statistics suggest that there is, comparatively speaking, an insignificant risk.

Over the last five years, no-one has been killed in Canada as a result of a train derailment involving the release of a dangerous commodity. Comparative frequency of death by other types of accidents follow:

APPROXIMATE CANADIAN ACCIDENTAL DEATHS PER YEAR

Cause		
Motor Vehicles	(1)	4,200 to 4,800
Water-Related	(1)	250 to 330
Air/Space-Related	(1)	150 to 220
Rail/Highway Crossings	(2)	80 to 110
Lightning	(1)	6 to 12

(1) Source: Statistics Canada - Catalogue-84-203 for years 1975 to 1978 rounded

(2) Source: Railway Transport Committee for years 1975 to 1980 rounded

Most of the accidents that make-up the above data would not be regarded by the public as catastrophic or spectacular. Catastrophic accidents (or random unpredictable events resulting in a large loss of life) cannot be graded, nor their inherent risks calculated, as can more frequent accidents. Nor should the risk of a catastrophic accident necessarily be equated to the significance of a spectacular or newsworthy accident. The potential for a catastrophe in a Mississauga type derailment lies with the tank car of dangerous commodities and the possibility of its rupturing violently and releasing its cargo quickly over a widely populated area. The Mississauga accident had the potential to become a catastrophe in terms of loss of life, but fortunately, events did not occur in such a way as to result in a catastrophe.

The potentially catastrophic nature of such an accident appears, however, to fall in the same class as the risk of an explosion of a ship unloading nitrate in Montreal Harbour, an earthquake in downtown Vancouver or a collision of two tank trucks carrying full loads of chlorine on a thoroughfare in Halifax. This is not to suggest that complacency should reign supreme, but in the overall climate of risk from all causes, neither should panic. The Panel believes that none of these potential accidents can be avoided by trying to make impossible that particular happening. What can be done are the great multitude of sensible actions which will uniformly improve rail, air, highway and marine transportation safety generally; things which may be small individually and not headline-catching, but nonetheless are the very foundation of safety.

2.5 Perspective Summary

The Panel has tried carefully to place the issues before it in a realistic perspective. Life cannot be made risk-free, nor can risks be reduced without costs. Although it is relatively easy to conceive of ways to reduce risks of hazard to life and health, it is far more difficult to draw the line between the ways which produce the desirable enhancement of safety and those which are unacceptable. That essentially was the task before the Panel and it is to this end that these findings are made.

3. FINDINGS

3.1 General

Grange J. in his Report commented that, "In the course of natural justice one does not normally make an order affecting another's rights or pocket book without giving that other a chance to be heard." The Panel has heard evidence and argument from a great number and variety of "others" who perceive themselves to be so affected in this case. The Panel has heard from those who perceived that an order to implement the three recommendations would support the public's right to safety and from those who deny it. Those have also been heard who contend that implementation would be economically devastating and those who contend otherwise. During the hearing the Panel has tried to be diligent in ensuring that all parties have had an adequate opportunity to present relevant facts and arguments.

The need for a speedy decision has been emphasized several times in the course of this hearing. With this, we are in full agreement. Further research and study may add somewhat to factual knowledge and understanding of the issues. However, the ground covered in this inquiry has been extensive, encompassing the physical, economic and risk factors essential in weighing the costs and benefits of relevant and forseeably available means to improve railway safety. The Panel feels that it is unlikely that further analysis of facts and refinement of detail could significantly improve within any reasonable future timeframe the evidence on which the findings are based. This, nevertheless, has not reduced the difficulty of making those findings.

The extensive amount of evidence offered to the Panel at the hearing has been summarized by Commission staff. This summary has proved useful to us in our deliberations and would, we believe, be useful in the future to others interested in this field. The Panel has therefore directed the staff to prepare a report containing this summary of evidence which will be issued to the public. It is also intended to include a Socio-Economic Impact Analysis of the orders and regulations contemplated in these findings. Because of the need for expeditious action in this matter the

Panel has chosen to release its findings and decision now, rather than await completion of the aforementioned report. This report will, however, be publicly available in the near future.

3.2 Special Dangerous Commodities

Before rendering findings with regard to Grange recommendations 1, 2 and 3 and options thereof it is important to clarify the Panel's findings on the definition of the dangerous commodities which require special handling and consideration.

The "Red Book" classifies over 3,000 commodities as dangerous, and regulates the packaging, documentation and handling of such commodities. However, not all these commodities are classified as dangerous because of the potential high degree of danger that they pose to the general public in the event of an accident, which is the type of danger of concern to the panel in this decision.

There were representations by a number of parties at the hearing to the effect that any special train handling measure (such as train speed or length restriction) which is adopted should only be applicable to commodities that present a significant risk to the public in the area surrounding the railway right of way in the event of a release during or after an accident. The Panel agrees with this view. The intent of these measures is to protect the general public and, therefore their implementation should be limited to those high risk commodities which pose a high risk of death or injury in the event of release.

There was much debate at the hearing as to the content of a list of high risk or "special dangerous commodities". The railways and certain shippers supported a list of thirty-four dangerous commodities, only seven of which are transported by rail in bulk (ie. in full rail car loads). Others suggested that a committee of government and industry experts be established to agree on a list.

The Panel has considered and rejected both of the above options. The list of thirty-four leaves out certain high risk commodities transported by rail in large quantities, such as propane. In view of the degree of discussion and the varying opinions of experts presented at this hearing, the Panel concludes that any committee is likely to take considerable time to come to agreement on a list. As stated before in this discussion, the Panel is not satisfied that the public interest is served by any delay in such matters at this time.

A list had been prepared by Railway Transport Committee staff prior to the Mississauga accident. The list contains the commodities, which, in the opinion of the RTC staff, pose the greatest degree of danger to the public in the event of release. The Panel has accordingly decided to direct implementation of the measures discussed elsewhere in this decision with reference to the commodities listed in Appendix 3. These dangerous commodities have been divided into two separate lists. List 1 contains the commodities that have been transported in railway carload lots in recent years. List 2 contains commodities which are very dangerous but have not, at least in recent years, been transported in full carload lots. When special dangerous commodities are referred to in this decision, what is meant, therefore, are full carload lots of the commodities listed in appendix 3.

It is not intended that these lists should be fixed forever. We are cognizant of the fact that additions or deletions may have to be made in the future because of changed conditions, new discoveries or further refinements in knowledge of the properties of various commodities. However, in view of the urgency of this matter, the Panel is of the view that it should decide on a special dangerous commodities list at this time even if further refinements to the list are required in the future.

3.3 Roller Bearings on Dangerous Commodity Trains

Recommendation 1(a) of the Grange report stated, "...trains transporting dangerous goods of any kind should be equipped...." such that "...all cars whether dangerous goods cars or not should have roller bearings...."

The evidence before Grange J. led him to comment on roller bearings as follows:

"Roller bearings have been with us for decades". "We know that journal failure with roller bearings is only a small fraction of that with friction bearings. We also know that a train is only as safe as its weakest car." "while a roller bearing journal failure is certainly not unknown and is harder to detect visually, it is vastly less likely to occur than is a plain bearing failure."

Response to the show cause order and other evidence indicated that a substantial proportion of the plain bearing equipped cars owned or leased by railways operating in Canada would have to be equipped with roller bearings to permit compliance with this recommendation. Modification of current operating practices could marginally reduce the number of cars requiring this retrofit. Although the number of cars requiring the conversion to roller bearings cannot be exactly ascertained, the Panel believes that the immediate implementation of this recommendation could theoretically involve in excess of 100,000 plain bearing cars owned and leased by Canadian-based railways and a large number of cars controlled by U.S.-based railways which operate in Canada under Commission jurisdiction.

Even if all of these plain bearing cars were immediately converted to roller bearing status, it would still be difficult for railways operating in Canada to comply completely. This would be due to the fact that cars would continue to be interchanged with U.S. railways who would not be bound by any order by CTC requiring conversion of rail cars to roller bearing status.

In any event, there is insufficient shop capacity to achieve an immediate conversion. Although estimates varied from railway to railway it appears that complete conversion of the existing plain bearing fleet, considering future car retirement programs, would take about ten years.

Cost estimates of converting plain bearing cars were offered in evidence and varied between carriers and by the method of conversion (i.e. full or partial conversion). The accuracy of these estimates, in the view of the panel, is not as significant as the overall order of magnitude of the investment required. The evidence shows that the capital cost of a complete roller bearing retrofit program of just the Canadian-based railway plain bearing fleet could well be in excess of $1.25 billion (1981 $) and by the most conservative possible estimate would be several hundreds of millions of dollars.

There were differences of opinion on what percentage of the North American car fleet is currently equipped with roller bearings. Estimates made in evidence ranged from 55 percent to 70 percent. The American Association of Railroads (AAR) equipment engineering division informs that 1,254,036 of the 1,710,827 cars in North America are roller bearing equipped (73.3%). What is clear, however, is that the proportion of cars owned or leased by Canadian-based railways that are roller bearing equipped is less than that which is prevalent in the United States or North America, running in the order of 40 percent (1980 figures indicate CN Rail at 39.7 percent; and CP Rail at 38.8 percent).

The Grange Report supported a view that roller bearings are far superior to plain bearings in performance and in terms of public safety. A great deal of detailed evidence was adduced before this panel on the subject of bearing performance, the end result of which was to make it far less evident that roller bearings have an overall advantage in terms of public safety in all circumstances and at all times.

It appears to the Panel that the concept that roller bearings are safer than plain bearings is no longer as strongly established as it appeared to be on the evidence available to Grange J. From a statistical point of view, two measures of bearing performance may be utilized, namely car miles per hot box (ie. when the bearing has been identified as being overheated) or alternatively car miles per burnt-off journal (ie. when the journal has burnt-off). The performance measure of car miles per hot box reflects the bearing's performance from the point of view of potential for bearing failure due to bearing characteristics as well as the degree to

which preventive maintenance is practised by the carrier. The measure of car miles per burnt-off journal, on the other hand, reflects bearing performance not only in relation to bearing characteristics and maintenance but also the degree to which car inspectors are successful in their jobs, train crews are adept and adequately performing running inspections, and hot box detectors are able to detect overheated bearings before failure. In other words, the measure of car miles per hot box is an effective measure of the railway's internal performance and really has no direct relevance to the issue of public safety. The measure of car miles per burnt-off journal on the other hand is a more relevant measure of the risk of hazard to the public resulting from derailments caused by bearing failure.

The historical evidence provided to the Panel appears to establish that plain bearings indeed have not been as safe as roller bearings. They have operated fewer car-miles per burnt-off journal than roller bearings, and fewer car-miles per hot box than roller bearings. In the case of CN Rail the yearly data shows that roller bearing hot box performance has ranged from 17 to 18 million car-miles per hot box as compared to 3 to 7 million car-miles per hot box for plain bearings. Roller bearings, on the other hand, experienced 100 to 140 million car-miles per burnt-off journal as compared to 20 to 70 million car-miles per burnt-off plain bearing journal.

Also of significance, however, is the apparent trend in the performance of plain bearings relative to roller bearings. Whereas over the last three years roller bearings still exhibit the better performance, plain bearing performance has substantially improved. Since 1978, for instance, CN Rail plain bearing performance has increased two-fold in terms of million car-miles per hot box and over three-fold in terms of million car-miles per burnt-off journal. Roller bearing performance, on the other hand, is relatively fixed if not slightly declining.

COMPARATIVE BEARING PERFORMANCE

(CN Rail)

	1978	1979	1980
1. Million Car Miles Per Hot Box Set-Out*			
a) Plain Bearing	3.4	4.7	6.7
b) Roller Bearing	18.4	17.2	17.3
2. Million Car-Miles Per Burnt-Off Journal			
a) Plain Bearing	21	22	72
b) Roller Bearing	138	102	128

* note: does not include hot box set-outs at terminals; for instance in 1980 Million Car-Miles Per All Hot Box set-outs was 3.6 for plain bearing and 11.4 for roller bearing.

From this, the Panel concludes that, although roller bearing performance has been better than plain bearing performance, recent improvements in plain bearing performance indicate that future safety of plain bearings may not be substantially less than that of roller bearings. The evidence also indicates that the recent improvement in plain bearing performance is a result of greater care having been taken in maintenance and inspection functions, an aspect that will be dealt with later in Section 3.7.

On another scale of measures, the historical data indicates that bearing failures have accounted for only 2% to 5% of all train accidents, and only 9% to 17% of derailments in recent years. These data also indicate a recent reduction in the number of accidents caused by plain bearing burn-offs and an increase in those caused by roller bearing burn-offs. In fact, in 1980, train derailments and accidents caused by plain bearing burn-offs were less than those caused by roller bearing burn-offs, as seen in the following table.

CN RAIL AND CP RAIL BEARING-RELATED ACCIDENTS AND DERAILMENT DATA

	1975	1976	1977	1978	1979	1980
1. Number of Accidents Caused by Burn-Offs of						
a) Plain Bearings	35	36	39	22	42	12
b) Roller Bearings	9	2	9	6	18	17
c) not identified	3	8	1	12	1	0
2. Percentage of Train Derailments Caused by Burn-Offs						
a) Plain Bearings	9.8	10.8	12.2	7.3	12.0	4.0
b) Roller Bearings	2.5	0.6	2.8	2.0	5.2	5.6
c) not identified	0.8	2.4	0.3	4.0	0.3	0.0
3. Percentage of Train Accidents Caused by Burn-Offs						
a) Plain Bearings	2.5	2.7	3.1	1.7	3.1	1.0
b) Roller Bearings	0.6	0.1	0.7	0.5	1.3	1.4

Source: RTC data

From the 1980 data, it could be concluded that there is really very little to choose from in the area of public safety between the two types of bearings. The detailed risk analysis of options conducted by Dr. Swoveland for the tank car leasing companies led to the claim that the retrofitting of plain bearing dangerous commodity cars with roller bearings would result in no appreciable difference in the number of dangerous commodity spills.

The Panel is concerned that the above conclusions could be misleading in the long term, since the plain bearing performance in 1980 may well have been materially affected by the accident which took place in Mississauga and the very wide spread publicity it received. The Mississauga incident ought to have made it clear to every carman, maintenance employee

and inspector employed by the Canadian railways that in carrying out their duties, they had in their hands the safety not only of their fellow railway employees, but also of the public at large. All of those employees were therefore probably doubly safety-conscious during that year. Unfortunately, the human memory tends to be short in matters of this kind, and in the absence of concerted efforts on the part of railway management and supervisory personnel to maintain that safety consciousness at that high level continuously, one could expect a gradual decrease in attentiveness and care in the maintenance and inspection of the railways' rolling stock and a resultant increase in plain bearing failures to their former level. That this phenomenon has already commenced may be evidenced by the fact that plain bearing burnt-off journal derailments reported to RTC from January to August of this year by both CN Rail and CP Rail have each doubled over those from the same period last year (from 7 to 15 for CN Rail and 2 to 4 for CP Rail).

After considering all of the evidence related to bearings, the Panel has concluded that, generally speaking, roller bearings can be safer bearings in terms of probability of burn-offs when looked at in terms of the average maintenance and inspection program of the average North American railway. The recent experience of the two major Canadian railways appears to demonstrate, however, that if the utmost care is exercised in purchasing the components for plain bearings, maintaining these bearings and inspecting trains and if hot box detector protection is adequate, the plain bearing can be made to approach the safety performance of a roller bearing. Unfortunately, no one can guarantee that the railways will in fact continuously exercise appropriate control in the purchase of components for plain bearings or that their maintenance and inspection programs will in all circumstances and at all times be as perfect as human ingenuity can make them.

As well, the Panel would have a feeling of uneasiness if it were physically possible instantaneously to change over all railway cars in North America to roller bearing status. It would have this apprehension even cognizant of the general position of the railway industry and others on the desirability of roller bearings, not only from the safety but also from an

economic point of view. The apprehension is that on the short term, an immediate changeover or indeed an increase of the proportion of roller bearing cars may effectively reduce the railway's average ability to detect overheated bearings quickly enough to prevent burn-off. This is because of the possibility (discussed at greater length in the part of this decision on spacing of hot box detectors) that roller bearings, once they malfunction, can go to destruction too quickly to be adequately detected by present technology. Until experimentation has produced reliable data on the burn-off characteristics of roller bearings, it would be irresponsible to only order a wholesale immediate change-over to roller bearings, even if that were practically and economically feasible.

From the economic impact point of view, while the capital investment required to convert all plain bearing cars to roller bearing status is immense, the evidence shows that there are offsetting operational cost savings arising from the conversion which can yield a return on that investment. Although the return may not be as great as that available from alternative investments, the Panel clearly realizes that the economic impact of conversion is not a one-sided capital drain on the railways, and in fact is materially less than one at first glance would surmise.

All evidence considered with regard to the Grange Recommendation one (a), the Panel concludes that it cannot be implemented immediately for the very practical reasons of limited shop and material availability. However, the Panel also concludes that an acceleration of the railways' current programs of changeover to roller bearings from plain bearings is desirable and would have some appreciable, though not profound, effect in improving public safety.

Much evidence was adduced regarding the need to ensure the unrestricted interchange of plain bearing cars from the United States to Canadian destinations. Indeed, the Panel concludes that it would be impossible, from a practical point of view, to make regulations that would refuse U.S. plain bearing cars access to Canada. Neither does the Panel consider it acceptable for the Canadian railway fleet to fall behind, in terms of the proportion of roller bearing cars prevalent in the North

American fleet. The Panel recognizes that it will take a number of years for Canadian railways not only to reach the current proportion of roller bearing cars in the North American fleet, but also to equal the North American growth in roller bearing cars. After due deliberation, the Committee is convinced and therefore will direct that Canadian railways will each attain a 75 percent proportion of their owned and leased revenue car fleet equipped with roller bearings by year-end 1987. In the interim, year-end reports on the progress of this conversion shall be submitted by the railways to the RTC. The panel will, in Section 3.7 herein, order additional inspection regulations which should help reduce the risk from continued use of plain bearings on Canadian railways.

In addition, the Panel will direct the railways to ensure that all cars newly acquired or leased by them shall be equipped with roller bearings.

The goal of having Canadian based railways attain a 75 percent roller bearing equipped revenue fleet (owned and leased) by year-end 1987 is related in part to the following points:

a) the present North American fleet (including non-railway owned and leased cars) is slightly less than 75 percent and is increasing at about 3-4 percent per year;

b) roughly 75 percent of the existing Canadian-based railway fleet was manufactured after 1950 and thereby conversion to roller bearing for these cars need not involve the expense associated with converting pre-1950 cars to meet AAR requirements;

c) the railways should not have to contract-out major amounts of bearing conversion work as their shop capacity should suffice - considering their planned car retirement rates, replacement of retired cars and acquisition of new cars to accommodate sizeable forecasts of traffic growth.

The capital cost of implementing the roller bearing conversion program will depend on:

a) the actual number of plain bearing cars that are retired over the next six years (probably 4,000 to 5,000 per year);

b) the number of plain bearing cars that the railways would have otherwise converted to roller bearings (probably 1,000 to 1,500 per year); and

c) the number of new roller bearing cars acquired by the railways to replace retirements and to accommodate new traffic offerings.

The unit cost of conversion should be assessed as the lowest cost to convert cars manufactured post-1950. If a railway wishes to do more than a simple conversion, including truck replacement for instance, then the cost of same is not attributable to this decision. The estimated maximum number of plain bearing cars that will have to be converted solely as a result of this decision is 4,500 to 6,000 cars per year for six years. The estimated capital cost of doing this therefore is $27 million to $42 million per year for six years or probably less than 20 percent of the railway estimated cost of implementing the Grange recommendation related to roller bearings.

Of course, the capital cost of implementing the roller bearing conversion in no way reflects the net economic impact of implementation on the railways. The evidence indicates that there are significant operational cost savings of roller bearings relative to plain bearings. An expert railway witness and a consultant for another party to the hearing claimed that roller bearing conversion yields an internal rate of return to the railways. One cannot therefore claim that the net cost of this program is in the order of the capital cost. Neither can the net cost (if indeed it is a cost and not a saving on the long term) be attributed to required movement of regulated dangerous commodity traffic offerings for it relates to all cars for overall safety reasons.

3.4 Tank Car Modifications

General

Recommendation 1(b), (c) and (d) stated that;

"...trains transporting dangerous goods of any kind should be equipped..." so that

"...all tank cars should have double shelf couplers;

"...all 112 and 114 tank cars should have head shields and thermal protection;

"...all 111 and 114 tank cars which have bottom fittings should have bottom fitting protection."

This part of the Grange recommendation number one addresses technical safety improvements to tank cars which decrease the chance of those tank cars rupturing and releasing their contents when subjected to the myriad of forces present when a derailment occurs. In this area of concern, a number of tank car related initiatives have been taken in North America in the recent past. In general, there has been a similarity in such initiatives in Canada and the United States. This is understandable when one considers the necessity for the smooth international interchange of railway tank cars.

In the United States, a rash of Mississauga-type accidents occurred in the late 1960's and early 1970's. These involved derailments with fires and release of dangerous commodities. Canadian and United States Government agencies, the AAR, and tank car owners and manufacturers have since taken those steps which they consider justified in the circumstances aimed at reducing to a publicly acceptable level, the risk of recurrence of those types of accidents. Most notable have been modifications to the jumbo cars (i.e. Specifications 112 and 114 tank cars). In this regard, it is worthy to note that major Canadian railways belong to the AAR and were thereby

party to AAR conclusions on tank car retrofit requirements. As well, it is significant to note that there is at present apparently no concerted public pressure in the United States for additional or more stringent measures such as many of those demanded before the Grange Inquiry or before this panel. From this, one could conclude that the United States public assumes its railways are managed and operated in an acceptably safety conscious way.

In reviewing the Grange Recommendations, the Panel nevertheless has been open to these and other recommendations which generally speaking go beyond the requirements imposed by law on railways in the United States.

Most tank cars are owned by shippers or tank car leasing companies. Railway companies own very few tank cars used for transporting dangerous commodities.

Three of the four tank car leasing companies which operate in Canada appeared jointly at the hearing. The Panel was thus provided with evidence on the size and content of the Canadian tank car fleet and the current state of tank car modifications and improvements.

Tank Car Types

Any tank car modification has to be considered in relation to individual tank car design. Different types of tank cars are required for different varieties of dangerous commodities depending on the properties of the commodity involved. Detailed specifications for the construction of these cars are prescribed in the CTC Regulations for the Transportation of Dangerous Commodities by Rail (the Red Book). The Red Book also prescribes which commodities can be carried in each type of car. Before dealing with each part of Grange Recommendation 1 b), c) and d), it is worthwhile to review the general types of tank cars and the significance of these different types of cars.

Specification 103 and 111 tank cars are used for transporting flammable liquids, acids and other corrosives. Both are non-pressurized cars and thus carry products which are not transported under pressure. Specification 111 cars may or may not be insulated depending on the commodity carried, while the 103 cars are always non-insulated.

Specification 112 cars were originally constructed as non-insulated, pressurized tank cars. Specification 114 cars are slightly modified 112 cars. The retrofit program, which was completed by June 30, 1981, resulted in thermal protection or insulation being added to all such cars used to transport flammable gases. Specification 105 cars are pressurized cars which have always been constructed with some insulation (although the amount varied with the particular type of 105 car). Some 105 cars do not have sufficient insulation to meet the same standard as the retrofitted 112 and 114 cars, although all are better protected than the non-insulated 112 and 114 cars.

Specification 112 and 114 cars are used to transport flammable and non-flammable compressed gases (i.e. products transported under pressure). Specification 105 cars are also used to carry such products, but there are certain products (such as chlorine) that can only be transported in 105 cars.

Generally speaking, the products that pose the most danger to <u>the general public</u> are carried in Specification 112, 114 and 105 cars.

<u>Double Shelf Couplers</u>

The evidence is clear that double shelf couplers are very worthwhile safety features for tank cars carrying dangerous commodities. They act to prevent or deter unintentional uncoupling of tank cars during train operations and accidents and the resultant punctures in the heads of adjoining tank cars. This type of puncture is one of the most prevalent causes of lading loss in derailment situations involving tank cars. By preventing uncoupling, double shelf couplers significantly reduce the risk of loss of lading in most accident circumstances.

Pursuant to CTC General Order 1979-1 Rail dated January 22, 1979, all Specification 112 and 114 tank cars have been required to be equipped with double shelf couplers since March 31, 1979. The three tank car companies who appeared at the hearing testified that all new tank cars built in the last three years have been equipped with double shelf couplers. There are, however, still Specification 105, 103 and 111 tank cars built before that time which are transporting dangerous commodities without the benefit of double shelf couplers. Because 105 cars carry the most dangerous commodities to the general public, the panel places a priority on equipping such cars with double shelf couplers. Railways will therefore be directed not to accept for transport after June 30, 1982, any Specification 105 car which is carrying any regulated commodity and not equipped with double shelf couplers. The same directive will apply to acceptance of 103, 111 and other CTC Specification tank cars carrying the generally less dangerous regulated products after February 28, 1985. Effective immediately, all new tank cars should be equipped with double shelf couplers.

Head Shields and Thermal Protection

CTC General Order 1979-1 required that all Specification 112 and 114 tank cars be equipped with a tank head puncture resistance system (i.e. head shields) and that all such tank cars carrying flammable gases be equipped with a thermal protection system. This retrofit program was completed by June 30, 1981.

The Panel heard evidence which indicated that, although up to this point in time there has not been an accident problem with 112 and 114 tank cars carrying products such as anhydrous ammonia and fluorocarbons which would have been alleviated by thermal protection, it was possible for tank cars containing such products to violently rupture. A violent rupture involving such products could well prove disastrous for an even larger area than a violent rupture of a tank car carrying liquefied petroleum gas. The Panel has thus concluded that all remaining 112 and 114 tank cars should be retrofitted with thermal protection. This should be completed by December 31, 1982.

Presently, both full and half head shields satisfy the requirements of the tank head puncture resistance system as prescribed by General Order 1979-1 Rail. The Panel heard evidence that the number of punctures has dropped considerably with introduction of head shield protection and double shelf couplers. However, at least one puncture has occurred in the last few years above the line of a half-head shield of the head of a tank car. This is not sufficient evidence to justify changing the head shields on existing cars. However, it is the Panel's view that new cars and any further retro-fitting should utilize the full rather than half head shield protection system.

Although the Grange recommendations in this area dealt only with 112 and 114 tank cars, the panel also heard evidence related to 105 cars, which carry many of the same kinds of products as the 112 and 114 tank cars. There are a number of different types of 105 cars and the degree of protection each has varies with the design specifications of the car. Some 105 cars already possess the equivalent of the tank head puncture resistance and thermal protection present on retrofitted 112 and 114 tank cars, but others do not.

The Panel has, accordingly, decided that all new 105 cars, constructed after December 31, 1981, with the exception of those built to a service pressure of 500 or more psi, shall be equipped with a tank head puncture resistance system equivalent to that now required for 112 and 114 tank cars (i.e. a full head shield). All 105 cars constructed after December 31, 1981 shall also be equipped with thermal protection equivalent to the present requirement for 112 and 114 tank cars. Some 105 cars already meet that requirement by virtue of the design specifications of the car, but tank car manufacturers will have to ensure after the beginning of the new year that all new 105 cars meet these thermal protection standards.

Bottom Fitting Protection

Some tank cars have bottom outlets. When such outlets are not recessed into the tank and are not otherwise protected (e.g. by skid plates), there is a great risk of the bottom outlet being sheared off in a derailment and the product consequently being spilled.

This problem has been recognized previously by the Railway Transport Committee in relation to the unit train sulphuric acid cars. These cars were required to be retrofitted with bottom outlet protection a number of years ago.

The AAR has also been concerned about this problem and has required retrofit of some cars depending on the danger (both to human beings and to the environment) and the volume of the product being carried. This Association has examined not only bottom outlets but also other bottom discontinuities, such as sumps and washouts. The AAR retrofit schedule is presently under review by that organization.

This form of retrofit is complicated by the need to take into account the different types of bottom discontinuities and of car construction, each of which have an effect on the type of protection required. The capital cost also varies with these factors, but it is estimated to average at least $3,000 per car for a total of about $22 million for the Canadian fleet.

The Committee is satisfied that progress is being made in this area through the AAR program. However, the Committee is not satisfied to leave this matter completely to industry action. Therefore, the Panel has decided that all new cars equipped with bottom outlets or bottom discontinuities, built after December 31, 1981, shall have such outlets protected as set out in the AAR Specifications for Tank Cars or recessed below the surface of the tank shell.

With regard to existing tank cars, we have directed the Dangerous Commodity Technical Review Committee to prepare a recommended retrofit schedule for cars carrying products on the Special Dangerous Commodity list and submit it to the Railway Transport Committee by February 1, 1982. The Dangerous Commodity Technical Review Committee has also been directed to prepare a recommended retrofit schedule for other cars carrying dangerous commodities and submit it by June 1, 1982.

3.5 Hot Box Detectors

Recommendation two of the Grange Report stated:

"Subject to Recommendation Three, the routes of any trains carrying dangerous goods through built-up areas should be protected by hot box detectors. No point within the built-up area should be more than 20 miles from hot box detector protection."

Grange J. said with regard to what constitutes a "built-up area" "...I have in mind any concentrated centre of population in the proximity of the track containing 500 or more people."

General

The hot box detector installation program of CN Rail has been considerably in advance of that of CP Rail. In the course of this public hearing, the Railway Transport Committee issued an Order (see appendix 5) requiring that CP Rail implement a stepped up hot box detector installation program which would result in CP Rail having reached approximately the same level of hot box detector protection as CN Rail by year-end 1983. It is the Panel's view that this program results in a number of hot box detectors that offers a minimum level of protection. In the absence of the development of a suitable onboard hot box detector system before 1983, the Panel also concludes that this number of hot box detectors should be increased beyond the level contemplated at present by the railways.

Most North American railways, including CN Rail and CP Rail, have used similar criteria for deciding on the exact placement of each individual hot box detector on their respective lines. For instance, detectors are not installed on track locations where train braking is prevalent, detector maintenance is difficult or where vandalism is most probable. The Panel finds no difficulty with these criteria and because of this the Panel would not advocate an exact and uniform system-wide detector spacing. The Panel does have difficulty, however, with the railways general hot box detector spacing guidelines of 25 to 30 miles between installation or between the detector and a terminal.

Both CN Rail and CP Rail proceeded with their hot box detector installation programs based on the number of hot boxes which their system had experienced at any given place at any given time. Thereby, the installation of hot box detectors has been primarily to facilitate the efficient movement of goods through taking action to reduce inefficiencies resulting from delays and accidents related to hot boxes. This approach, however, seemingly down plays the use of hot box detectors purely to improve public safety.

If the railway companies are maintaining a uniform level of car and track maintenance and inspection at all points across their systems, the occurrence of hot boxes should logically be random in terms of the locations of occurrence, all other things equal. The frequency of occurrence at one location relative to another would, however, reasonably vary in accordance only with the volume of traffic. If hot box occurrences happen at an abnormal frequency at a particular location, traffic levels taken into account, one could conclude that car inspection local to that place is not what it should be. In this regard, the Panel will require railways to report to the RTC the occurrence of not only burnt-off journals by bearing type but also of each hot box and the location and date of those occurrences. As well, the Panel will consider the occurrence of an unusual number of hot boxes at any given location, not related to traffic volume, as an indication of some deficiency in local maintenance or inspection and appropriate action will be required of the railways to rectify this problem.

If inspection and maintenance are uniformly adequate across the systems, then the general priority of hot box detector spacing would seem reasonably to be governed by traffic volume and population density in proximity to the track, rather than hot box occurrence frequency. Furthermore, if hot box detector protection is primarily to reduce hazards of dangerous commodity leaks (i.e. for increased public safety) hot box detector installations should generally proceed in accordance with a priority dictated by the level of dangerous commodity traffic and particularly the special dangerous commodities listed in Appendix 3. The

Panel will therefore expect the railway companies to review their system of general priorities for hot box detector installation with these factors in mind.

Hot Box Detector Spacing and Installation Priorities

Grange J. arbitrarily chose the figure of 20 miles as being the minimum separation between hot box detectors in built-up areas and he further defined built-up areas as any place having a population density of 500 people living in the vicinity of the track. The railways' arguments were quite rightly dependent on these criteria, insofar as hot box installations are concerned, since these were the criteria set out in the Committee's Show Cause Order.

Canadian railways have proceeded with their hot box detector installation programs using a spacing which is comparable with the spacing used by other railways in North America. The spacing of between 25 and 30 miles was essentially based on the time which a plain bearing takes to burn-off after initial overheating takes place. It therefore appears to the Panel that the spacing is adequate insofar as it relates to plain bearings. Unfortunately, the matter is not so clear when the characteristics of roller bearings are taken into account. Some witnesses admitted that roller bearings may burn off more quickly than plain bearings once malfunctioning of the bearing commences. In fact, the statistics for the last two years suggest that a roller bearing may burn-off very quickly, over substantially shorter distances than those dictated by the chosen spacing criteria. There is not sufficient evidence available at this time for the Panel to arrive at any firm conclusion on this matter, but at least a possibility exists that a hot box detector program based on spacings of 25 to 30 miles may be inadequate to detect overheating of roller bearings. In fact, even the twenty miles separation suggested by Grange J. may be inadequate.

The Panel therefore is not satisfied that it has sufficient grounds to justify ordering the spacing of hot box detectors closer than twenty miles apart in, or about, population centres having 500 or more people in proximity to the track. Certainly no party at the Show Cause hearing

supported that population criterion. As well, considering the capital cost of over $100,000 per installation, the economic burden of such a massive hot box detector program is not warranted at this time, if at any time.

In regard to hot box detector spacing, however, the Panel considers it vital that reliable information be obtained of the actual times taken for a roller bearing to burn-off under different conditions. The Panel will therefore refer this requirement for study to the Technical Research Committee of Strategic Planning, Transport Canada for action. As mentioned previously, the RTC will monitor carefully on an on-going basis all hot box and burn-off occurrences. Results of both of these efforts will serve to determine if a future reduction in the existing general hot box detector spacing standard is required.

There is ample evidence to conclude that massive additions of hot box detectors to Canadian railway systems cannot be accomplished over night. There are limits to the availability of detectors and to the ability to install them. Priority guidelines are first required before considering what is necessary to obtain adequate system-wide hot box detector protection. In this regard, the Panel was impressed with the argument advanced by M-Trac that the difficulty of evacuation of an area adjacent to the track is an important factor and should be given priority consideration.

The Panel recognizes that traffic volume and dangerous commodity traffic volume are also reasonable factors to set priorities of installation. Nevertheless, the Panel concludes that population should be the primary factor governing the priority of future installation programs.

Protection of Metropolitan Areas

In Canada there are about 24 census metropolitan areas which are traversed by railways and which house in excess of 100,000 people (see Appendix 4). Of utmost urgency is the assurance that these areas are protected in accordance with the attendant risks of high population density centers. The Panel therefore will order the railways to adopt a twenty-mile hot box detector spacing criterion for use on railway lines within those metropolitan areas which carry special dangerous commodities and the

immediate commencement of an installation program to meet that criterion, the program to be completed by October 1, 1982. As an alternative to installation of hot box detectors, mechanical inspections by railway personnel may be substituted if performed at similar intervals. In either case, measurement for spacing purposes is to begin at the point of gateway inspection.

Gateway Inspections

The Panel also believes and therefore shall order that all trains carrying any special dangerous commodity should be subjected to a mechanical "gateway" inspection before proceeding into a metropolitan area. The location of the inspection should be no further than 20 miles from the boundaries of the metropolitan area and no closer than 3 miles thereto.

Such gateway inspection need not necessarily be done physically by railway employees but rather it might be accomplished by the use of available technology in the form of trackside scanners designed to detect hot wheels, overheated journal bearings, dragging equipment, extra dimensional loads or other unsafe conditions which are capable of being automatically detected. The panel sees little reason why a gateway inspection of this type could not be implemented in short order.

The possibility of creating special scanner terminals for gateway inspection should be examined by the railways for near future installation. Such a terminal could consist of standard hot box detectors for conditions requiring immediate stopping of a train. In addition, special hot box detectors adjusted to read a wider than normal heat differential could be part of the system. These detectors could also be instrumented to provide remote readout at the car inspection and maintenance facilities to alert car staff to developing problems.

Accordingly, the railway companies will be expected to provide the Railway Transport Committee, within sixty (60) days of the issuance of this Decision, with their plans for immediate and near future gateway inspection for Canadian metropolitan areas.

The gateway inspection principle outlined above should be expanded on by the railways by phasing in similar protection for less densely populated areas in the coming years. In this respect, the Committee will order that all areas with a population between 50,000 and 100,000 be so protected by October 1, 1984 and those with a population between 10,000 and 50,000 be so protected by October 1, 1987.

In certain unique circumstances, the practical implementation of these directives, to the letter, may be very difficult and perhaps may warrant reconsideration by RTC in light of special circumstances. The Committee therefore directs the railways to inform the RTC of these unique circumstances (if any) and within reason minor adjustments to the above directives will be considered on a case by case basis.

As well, the panel considers that the above requirements for hot box protection within metropolitan areas could be waived where trains carrying special dangerous commodities are operated at less than 15 mph.

To a large degree, the Canadian railways have already provided or are committed to providing for sound hot box detection. The hot box detection program ordered by this decision is considered to be reasonable and attainable within the timetable provided. It affords the railways the option to employ either mechanical inspections by railway employees or hot box detectors and considering the fact that there is such protection in existence in many places, the actual cost of this program is difficult to ascertain. A maximum possible figure can, however, be estimated.

It is estimated that if there were no hot box protection in existence or being planned and if all protection was by hot box detector, in the order of 350 to 400 hot box detectors would have to be installed over the next six years: 160 to 170 for protection of census metropolitan areas and 190 to 230 for population centers in excess of 10,000 people which are not or which do not fall within census metropolitan areas.

Existing or planned hot box detectors will number in excess of 500 within the next six years, therefore the number of installations required to comply will undoubtedly be far less than 400 hot box detectors or 400 locations where mechanical inspections are required (probably far less than 200). As the cost of a hot box and dragging equipment detector is roughly \$100,000 and operation and maintenance is estimated at \$8,000 per unit-year, the absolute maximum capital cost of the program therefore is estimated at \$20 million over six years and \$1.6 million per year.

It should be noted that these capital and operating costs are hypothetical figures. Even if they are actual, the hot box protection program is not totally a capital drain on the railways. Operational cost savings will be realized through decreased chance of derailment of any car - whether it carries dangerous commodities or not.

Onboard Hot Box Detectors

The problems of journal burn-offs and hot box detector location and spacing would, of course, be solved by the development and utilization of a reliable and cheap onboard detector system. Evidence was adduced by Dr. Korenberg who claimed to have invented such a system, and who admitted that his invention could not be properly evaluated without field tests on railway equipment, tests which he could not perform without the cooperaton and assistance of the railway companies, or at least one railway company. CP Rail, for whom Dr. Korenberg worked at the time of developing the invention, expressed no enthusiasm for the invention at the hearing. CN Rail indicated a willingness to at least consider the invention.

The Panel is reluctant to order CN Rail and CP Rail to conduct field trials of the invention if their technical experts are firmly of the opinion that the invention is impractical in day to day use under normal railway operating conditions. It appears clear that if the invention will not work in a reliable way in all operating conditions, it will never constitute a substitute for the detectors now in use, and will not in any case do the job of dragging equipment or hot wheel detectors. Nonetheless, the Panel considers that a field test of the invention arranged jointly by

the two railways preferably under the worst possible operating conditions should not involve the railways in a great deal of expense and recommends that suggestion to CN Rail and CP Rail for their serious consideration.

3.6 Train Length and Speed Restrictions

General

Recommendation three of the Grange Report stated:

> "If a dangerous goods train does not comply with Recommendation One, it should not exceed 4,000 feet in length regardless of the hot box detector protection provided.
>
> If the dangerous goods train does not comply with Recommendation One, or if the route of the dangerous goods train passing through a built-up area does not comply with Recommendation Two, the train passing through the built-up area should not exceed 25 miles per hour."

Grange J. said on speed that "whatever may be the relationship between speed and derailment, the damage suffered upon a derailment must increase with the speed." On train length, it was said that "The length of trains is probably just as important to the railways as speed." "Almost every regular or former crew member testified...the limit for viewing the undercarriage was under 20 cars on the straight away and not more than 50 cars even on a good curve..." "...it is clear that there are limitations of sight when the train is a long one." "Commission counsel suggested a limit on length of 3,000 feet and Mr. Roger O'Brien, the vice-president of the United Transportation Union, suggests 4,000 feet...there is certainly attraction in either proposal because it would make the undercarriage of all cars visible from one end or the other on a reasonable curve and in clear weather."

Train Length Restriction

Not one party at the show cause hearing supported the implementation of train length restrictions to 4,000 feet. It appears to the Panel that the only safety advantage to be gained by shortening the length of

trains carrying dangerous commodities to 4,000 feet is that in good visibility when the nature of the track allows the front and rear end crews of the train to inspect the trains enroute, shortening the train will allow them to carry out that function more adequately. In many areas, the nature of the track makes this type of inspection difficult or impossible. In some weather conditions this type of inspection is also useless. As against that one advantage, shortening the length of the trains will increase the number of trains and that by itself may increase the risk of additional accidents. Increasing the number of trains will increase the use of level crossings by trains and hence can be expected to increase the number of level crossing accidents. Reducing the length of trains will have a very substantial impact on the economic operation of the railways requiring additional crews, additional motive power and additional rolling stock. In areas where the rail lines are already being used almost to capacity, it will in addition result in capacity problems.

The Panel has no hesitation in finding that this recommendation has no overall safety advantage, and that it will increase risk to the public more than it will improve safety. This, coupled with the very high cost implications leads the panel to conclude that the recommendation for limiting the length of trains carrying dangerous commodities should not be implemented.

Train Speed Restriction

The twenty-five mile per hour speed limit chosen by Grange J. and the criteria which he has suggested for imposing it do not appear to the Panel to have been based upon scientific studies or data. However, the Panel has no difficulty in accepting that the chance of tank car rupture is greater at faster speeds, upon the event of a derailment, than at more moderate speeds.

The evidence presented by the railways offers a number of reasons to be concerned about the twenty-five mile per hour figure, as well as the technical safety implications of operating trains at less than track speed and of accelerating and decelerating trains to meet the limit in certain track areas. The evidence adduced also indicates that the recommended speed

reduction will have a substantial effect on transportation efficiency, crew, rolling stock and power capacity and other factors which will result in large increases in operating expense and sizeable reductions in certain main line track capacity.

Generally speaking, railways set train speed limits which are related to the design of their track. The super elevation of a curve, for instance, is designed for a certain train speed. Lower train speeds over such a curve cause increased hazard of derailment and increased track maintenance costs. Posted speed limits may, however, be less than track design speed for a variety of reasons. The number of train speed changes are normally limited to reduce the frequency of "buff and slack" forces associated with train acceleration and deceleration. These forces can cause knuckle and draw bar failure which can result in derailment. For these reasons, therefore, implementation of speed limits well below track design speed and in numerous locations may increase the frequency of derailments.

The railways also argued that the twenty-five mile per hour limit is sufficiently close to that producing the phenomenon referred to as harmonic oscillation that chances of derailment will be increased in areas where the speed limit is imposed. The harmonic oscillation of railway cars occurs when those cars whose center to center spacing of trucks is the same as the length of 39 foot jointed rail travel over that rail at speeds ranging from 10 to 25 miles per hour. This phenomenon is very complex. Essentially, the car begins to rock side to side on the rails and thereby becomes more prone to the chance of derailment. Even though the Panel understands that, to a large degree, this problem has been resolved and is not as prevalent as it was in the late 1960's and early 1970's, the probability of the speed limit proposed increasing this occurrence is of concern.

More specifically, the suggested speed limit is at the top end of the train speed range at which harmonic oscillation is most frequent. It could be argued that the speed limit is nonetheless warranted when this fact is weighed against the benefit of reduced chance of tank car rupture upon derailment. The trade-off is not that clear, however. Train crews

attempting to achieve a speed limit of twenty-five miles per hour will in practice tend to operate below that speed and at times perhaps appreciably below it in the speed conditions where this phenomenon is most prevalent. There is clearly a need to balance the more negative effects of speed reduction on the chance of derailment against the more positive effects of speed reduction on the risk of tank car puncture in the event of a derailment.

All of this considered, the Panel concludes that the twenty-five mile per hour train speed limit is too slow to yield a net positive benefit to public safety. The Panel nevertheless finds that the concept of a train speed limit in certain high hazard areas makes very sound sense. The setting of a speed limit in this context must rely mainly on the long established track engineering principles and on the powers of intuition and common sense rather than hard statistical data and risk analysis. Such data and analysis simply do not exist in sufficient detail with sufficient reliability to be accurate.

After considering this subject matter carefully, the Panel is receptive to the suggestion that in very high population areas dangerous commodity carrying train speed should be restricted and in lower population density areas where adequate gateway inspection and hot box detector installations are not present some moderation of train speeds should be imposed.

As an immediate measure, the Committee will order that in metropolitan areas having a population of 100,000 or more, the speeds of trains carrying special dangerous commodities should be restricted to thirty-five miles per hour. The Panel has chosen thirty-five miles per hour, because that speed avoids harmonic oscillation risk and because it appears to the Panel that there would be very little difference in the risk of puncture of dangerous commodity carrying cars between a maximum speed limit of twenty-five miles per hour and one of thirty-five miles per hour. As well, the Panel realizes that in practice train crews attempting to achieve this limit will in all probability realize actual train speed at a lower

level. From an economic point of view, the cost of such a speed limitation under these restrictive conditions is substantially below the cost incurred by the 25 mph Grange recommendation.

As well, pending adequate gateway inspection facilities/procedures, for areas housing 50,000 to 100,000 people the panel will order that all trains carrying special dangerous commodities shall be restricted to thirty-five miles per hour through those areas.

3.7 Car Inspection

During the inquiry, the Panel had the benefit of sworn testimony from a wide range of experts in the manufacturing, packaging and transporting of dangerous commodities, as well as experts in equipment design and the management of accidents and emergency situations involving dangerous commodities. While it may be said that some of the witnesses had a particular bias, it can be said with equal, if not greater weight, that collectively the expert witnesses heard from constitute the largest pool of knowledge in existence concerning the safe transport of dangerous commodities by rail. Almost all concurred that proper and frequent inspection of cars and trains offers perhaps the greatest single prospect for improvement in the movement of dangerous commodities.

The need to regulate inspection procedures was voiced in various ways by a number of witnesses. These witnesses included shippers, public interest groups and even certain railway companies.

The Canadian Safety Council saw need for improved train inspection as an alternative to low speeds, while M-Trac in their argument also favoured increased train inspection before trains enter cities or heavily populated areas. Witnesses for the Canadian Association of Fire Chiefs supported regulations to improve maintenance and design of rail cars. Counsel for both Metro-Toronto and the Government of Ontario argued that increased inspections were essential. Mrs. Lax inclined toward hot box detectors but also supported increased maintenance and physical inspections while Mr. Burtnick proposed that the Commission designate inspection points where proper, complete and thorough train inspections should be made.

Among witnesses whose interests might be thought closer to the railways, Dr. Harris, Vice-President of the Association of American Railroads said that plain bearings are as safe as roller bearings if properly lubricated and maintained. This would imply that adequate inspection of plain bearings is required to assure proper lubrication and maintenance. This also was the position of various tank-car companies.

Even certain railways subscribed to the need for improved inspection. The Algoma Central Railroad preferred physical enroute inspection to the use of hot box detectors because of the added protection it afforded in detecting other defects and recommended "physical inspection procedures approved by RTC" as an acceptable alternative to hot box detectors. With this the Panel fully agrees. Norfolk and Western Railroad witness Mr. Sharp also said that the best chance of improving the record of hot box occurrence is in inspection of trains.

The Ontario Northland Railroad witness K. Moorehead testified that his railroad is equipped with hot box detectors but nevertheless requires standing inspection of freight trains each 75 miles. Mr. Moorehead testified that the last hot box on the Ontario Northland occurred 14 years ago.

Mr. J. Cann, of Canadian National Railways, under cross-examination admitted that the AAR publish inspection standards for cars but there are no inspection frequency standards at line points for trains. Mr. Cann also stated that, in his opinion, better inspection was one of the reasons for the recent improved safety record for plain bearings.

Canadian Pacific witness G. Bartley said that "The number of burn offs is really a function of your ability or inability to detect the fault once it occurs." He said that a nominal 500 mile inspection of trains with plain bearings would be maintained to assure safe operations.

Despite this expert opinion, the apparent trend has been towards less rather than more inspection where the choice has rested solely with the railways.

Over the past two decades, railways in Canada, in an effort to take full advantage of new technology, have gradually phased out a large number of local operations resulting in a marked decrease in train inspections by railway employees who were previously located at wayside points and intermediate terminals. Examples of this trend can be seen in: the reduction of agent/operator positions which resulted from a combination of the installation of central traffic control and the introduction of centralized railway freight agencies; the reduction of on-line maintenance-of-way personnel through the use of large mechanized gangs; and the "one spot" system of car maintenance which has seen the establishment of large repair units at a handful of terminals across the country replacing a multiplicity of small shops which previously existed.

The conversion to diesel-electric motive power has also had the effect of reducing inspection opportunities by eliminating fuel and water stops. This, coupled with longer trains and reduced train crews, has made en route inspection of trains less dependable.

The cumulative effect of all of these developments has been that train inspections have become less frequent, are performed by fewer and fewer qualified personnel and at greater distance intervals.

The Panel is convinced, therefore, that to assure a reasonable level of operating safety the time has come to require railways, by regulation, to meet certain minimum standards in the training and qualification of car inspection personnel by railway system management, and in the inspection, reporting and repair of defects in rolling stock.

The Railway Transport Committee will, therefore, proceed with the drafting of regulations which will require that every train, whether carrying dangerous commodities or not, must have a prescribed mechanical inspection by qualified railway personnel at intervals to be specified by the Committee.

The regulations will require that a prescribed mechanical inspection be performed on all cars and that these cars must be inspected by qualified railway personnel at every interchange point before being accepted for forwarding by another railway. In addition, loaded cars initially received by the railway from a shipper or manufacturer of dangerous commodities must receive a prescribed mechanical inspection to be performed by qualified railway personnel not farther than 25 miles from the shipper or manufacturer point of origin.

3.8 Marshalling Options

When one is required to decide on the merits of national implementation of a series of recommendations based on causes, circumstances and outcomes of a site-specific incident, it is wise to also consider other options that may have the same or greater effect but at a lower cost. The Panel has done this as evidenced previously in findings pertaining to car inspection and maintenance. Another option has been introduced by the railways. It pertains to the special marshalling of cars carrying the more lethal dangerous commodities.

Indeed, the Railway Transport Committee recognized certain merits in this type of option when it issued an interim dangerous commodity marshalling Order (see appendix 6) immediately following the Mississauga accident to augment existing marshalling regulations. This Order required that railway cars carrying liquified flammable gases be separated from cars carrying chlorine, anhydrous ammonia or sulphur dioxide by 5 non-placarded cars. The intention of the Order was to separate products such as propane from commodities such as chlorine and thus, in the case of a derailment, reduce the risk of propane fires or explosions causing release of chlorine. The Panel has concluded that the interim Order should remain in force pending conclusion of the present RTC review of marshalling rules.

The other dangerous commodity marshalling options proposed at the hearing involved increased marshalling restrictions applied to trains carrying the more lethal high volume types of dangerous commodities. In

essence, the most reasonable hybrid of these options involved an alternative to the need for total roller bearing retrofit, and speed and length restrictions. This option supported the marshalling of tank cars to the front 2,000 feet of the train, buffered by the standard five car limit from the locomotives with all dangerous commodity and buffer cars being roller bearing equipped.

There are several apparent merits to this option. There would be no plain bearing cars marshalled in front of the cars carrying the more lethal dangerous commodities and those cars would also be roller bearing equipped. This therefore would remove the concern for the higher probability of a plain bearing failure occurring in front of a car carrying the more lethal dangerous commodities. Therefore it would reduce derailment chances of that type of car. It also has the advantage of placing the cars carrying the more hazardous commodities in proximity to the front end of the train, hence the ease and effectiveness of running inspections of such cars is enhanced without having to restrict the total length of the train. The economic benefits of doing this vis-a-vis the Grange recommendations dealing with roller bearings and train length are apparently sizeable, although the cost of this type of special marshalling is not small.

The Panel was very impressed by the evidence from the chemical experts who testified about the potential difficulties which would be encountered if all dangerous commodities being carried on a given train were marshalled in a block in one part of the train, preceded by all roller bearing cars. The evidence suggested that in those circumstances a derailment could conceivably result in such a mix of chemicals and chemical by-products that no expert could be expected to forecast the result or give practical advice at the scene.

It is also clear that the risk of plain bearing failure does not have to be as high, relative to roller bearing performance, as it has been in the past. As well, the effectiveness of running inspections in some situations is questionable at best.

The risk analysis performed by Dr. C. Swoveland, for the tank car companies concluded that the head-end marshalling of dangerous commodity tank cars is less safe than random marshalling of such cars between the first five and last five cars in the train.

Evidence was also given that leads the panel to further question the net safety benefits of the "front-end" marshalling option. Vehicle to train collisions at railway-highway crossings tend to result in the freight cars to the front of the train being impacted more often than the mid and rear section of the train. This poses a serious probability of increasing the number of dangerous commodity car ruptures and releases and hence is a counter-productive factor.

The Panel therefore concludes that, aside from its continuation of the interim Order separating cars carrying flammable compressed gases from cars carrying chlorine, anhydrous ammonia or sulphur dioxide, it should not issue further marshalling Orders but rather should allow continuation of the present safer method of marshalling the dangerous commodity cars without further restriction which usually results in cars of a particular commodity being marshalled together as a result of being picked up together, thereby simplifying to some degree, the post-accident problems.

3.9 Summary

In considering the volume of written and oral evidence presented to the Panel at this hearing, we have tried to balance the need for public safety with the legitimate public interest in the economic health of the railways, the industries dependant on rail transportation and of the consumers of those industries' products. In performing this task we have found a number of shortcomings in the railways' current performance and have accordingly directed in this decision that a number of changes be made. The following is a summary of the decisions made by the Panel herein:

ROLLER BEARINGS

1. Canadian railways are to convert to roller bearings sufficient cars to ensure that 75 percent of their owned and leased revenue car fleet are roller bearing equipped by December 31, 1987 (year-end progress reports

are to be submitted by each railway to the RTC). As well, all cars newly acquired or leased by Canadian railways shall be roller bearing equipped.

TANK CAR MODIFICATIONS

Double shelf couplers

2. No specification 105 tank cars carrying any regulated commodity will be accepted for transport after June 30, 1982, unless equipped with double shelf couplers.

3. No specification 103, 111 or other CTC specification tank cars carrying any regulated commodity will be accepted for transport after February 28, 1985, unless equipped with double shelf couplers.

4. No tank car built after the date of issuance of this decision will be accepted for transport unless equipped with double shelf couplers.

Head Shields

5. Only full head shields are to be used henceforth on new cars and for future retrofitting.

6. All new 105 tank cars constructed after December 31, 1981, with the exception of those constructed to a service pressure of 500 or more psi, shall be equipped with a tank head puncture resistance system equivalent to that now required for specification 112 and 114 tank cars or they will not be accepted for transport.

Thermal Protection

7. No specification 112 and 114 tank cars carrying any dangerous commodity will be accepted for transport after December 31, 1982 unless equipped with thermal protection.

8. All new 105 cars constructed after December 31, 1981 shall be equipped with thermal protection or insulation equivalent to the present requirements for 112 and 114 tank cars or they will not be accepted for transport.

Bottom Fitting Protection

9. All new cars equipped with bottom outlets or other bottom discontinuities built after December 31, 1981 shall have such outlets protected as set out in the AAR Specifications for Tank Cars or recessed below the surface of the tank shell or they will not be accepted for transport.

10. The Dangerous Commodity Technical Review Committee shall prepare and submit to the Railway Transport Committee

(i) by February 1, 1982 a retrofit schedule for the protection of bottom discontinuities on all tank cars carrying special dangerous commodities.

(ii) by June 1, 1982 a retrofit schedule for the protection of bottom discontinuities on all tank cars carrying other dangerous commodities.

HOT BOX DETECTORS

11. Trains carrying any special dangerous commodity shall undergo a "gateway" inspection, at minimum consisting of a hot box and dragging equipment detector or a mechanical inspection by railway employees before entering a populated area. A similar further inspection at no more than 20 mile intervals, relative to the location of the gateway inspection points, within the populated area will be required unless the special dangerous commodity train operates below 15 m.p.h.

The gateway inspection is to take place no closer than 3 miles and no more than 20 miles from the boundary of a populated area.

For the purposes of this requirement a populated area is defined as a densely populated area and priority is granted those areas in which evacuation in the event of an emergency would be very difficult.

Due to practical difficulties in implementing the requirement it will be phased in starting with the largest cities. It will be effective:

(a) immediately upon RTC approval of plans to be submitted by each railway within sixty (60) days hereof in census metropolitan areas with a population of over 100,000 (listed in Appendix 4),

(b) October 1, 1984 for populated areas with a population of 50,000 to 100,000 but not within a census metropolitan area and

(c) October 1, 1987 for populated areas with a population of 10,000 to 50,000 but not within a census metropolitan area.

12. Railways shall immediately commence reporting to the Railway Transport Committee all hot box occurrences, whether or not they result in a burn-off or a derailment. Such reports are to include the type of bearing and car involved, the date and location of the occurrence, the distance from the last hot box detector and/or inspection, and whether any abnormal indication registered on the previous hot box detector.

13. It is recommended that the Technical Research Committee of Strategic Planning, Transport Canada investigate the possibility of conducting tests on the time taken for a roller bearing to go to failure under various conditions.

14. Railway companies will be expected to review their system of priorities for hot box detector installation in areas not identified in item 11 to ensure that the highest priority is dictated by the level of dangerous commodity traffic and in particular the level of special dangerous commodity traffic.

TRAIN LENGTH

15. No restrictions will be imposed on train length.

TRAIN SPEED

16. In census metropolitan areas with a population of 100,000 or more (as listed in Appendix 4) trains carrying special dangerous commodities shall travel at no more than 35 mph and in areas of population from 50,000 to 100,000 where provisions for protection as defined in item 11 have not been implemented, trains carrying special dangerous commodities shall travel at no more than 35 mph. In areas of population from 10,000 to 50,000 not protected as defined in item 11 trains carrying special dangerous commodities shall travel at no more than 35 mph after October 1, 1987.

CAR INSPECTION

17. Regulations will be drafted requiring a prescribed complete mechanical inspection by qualified personnel of all rail cars in a train, whether carrying dangerous commodities or not, at intervals to be specified by the Commission, and at interchange points before acceptance for forwarding from another railway.

Further regulations will be drafted such that cars loaded with dangerous commodities initially received by the railway from a shipper or manufacturer must receive a prescribed mechanical inspection to be performed by qualified railway personnel not farther than 25 miles from the shipper or manufacturer point of origin.

18. In the interim, section 74.596 of the Regulations for the Transportation of Dangerous Commodities by Rail (which requires inspection of tank cars carrying dangerous commodities before acceptance by a carrier) will be enlarged to include all cars carrying dangerous commodities (and not just tank cars).

It is the judgment of the Panel that these safety initiatives will not appreciably affect the competitive position of the railways relative to other modes of transportation; will not require additional public financial support; and will not make necessary any undue increase in charges for railways services.

3.10 Concluding Remarks

The RTC had earlier identified a need for an increase in its own safety program (in such areas as track inspection referred to earlier herein), and had accordingly requested an increase in the number of Committee staff. The Committee wishes to express its satisfaction with the decision of Treasury Board to approve its past request and to increase the staff of the Railway Transport Committee over a two year period by 31 person years. This additional staff will be assigned to safety related duties and will enable the Railway Transport Committee to institute a more comprehensive and complete safety program than has hitherto been possible. The Railway Transport Committee's ability to itself promote safety and carry out sufficient inspections to ensure that the railways are also abiding by their safety responsibilities should be greatly enhanced.

The Panel wishes to express its appreciation once more to all the witnesses and parties who appeared before it at the public hearing and to all those who took the time and effort to provide the panel with their views in writing. Everyone presented their evidence and conducted their cases in a responsible and effective way and were of great assistance to the panel in its deliberations.

The quest for the highest possible degree of safety in all modes of transportation is a never ending one, and this hearing and the Orders, Rules and Regulations which will follow it, are merely new and we hope important

steps on that long road. Those Orders provided for herein which could be prepared in the time available will be issued concurrently with this document, the remainder will follow within the next few weeks. It is the panel's intention that all will be in force on or before November 1st of this year.

(signed)

John T. Gray

John T. Gray, Q.C.
Chairman
Railway Transport Committee

John Magee

John Magee
Commissioner

J.F. Walter

J.F. Walter
Commissioner

APPENDIX 1

RAILWAY TRANSPORT COMMITTEE

ORDER NO. R-31781

January 23, 1981.

IN THE MATTER OF the transportation of dangerous commodities by rail; and,

IN THE MATTER OF the recommendations contained in the Report of the Mississauga Railway Accident Inquiry dated December 1980, (hereinafter called the "Report").

File No.: 50076.1

WHEREAS Mr. Justice Samuel G.M. Grange, after a public hearing and investigation into the derailment that occurred in Mississauga, Ontario on November 10, 1979, made a number of recommendations in the Report aimed at improving the safety of the transportation of dangerous commodities by rail; and,

WHEREAS the Railway Transport Committee is currently reviewing those recommendations which lie within its jurisdiction; and,

WHEREAS Recommendation Three of the Report states:

> "If a dangerous goods train does not comply with Recommendation One, it should not exceed 4,000 feet in length regardless of the hot box detector protection provided.
>
> If the dangerous goods train does not comply with Recommendation One, or if the route of the dangerous goods train passing through

COMITE DES TRANSPORTS PAR CHEMIN DE FER

ORDONNANCE N° R-31781

Le 23 janvier 1981

RELATIVE au transport de marchandises dangereuses par chemin de fer; et

RELATIVE aux recommandations énoncées dans le rapport d'enquête sur l'accident ferroviaire de Mississauga, en date de décembre 1980 (ci-après appelé le "rapport").

Dossier n° 50076.1

ATTENDU qu'après la tenue d'une audience publique et d'une enquête sur le déraillement survenu à Mississauga (Ontario) le 10 novembre 1979, le juge Samuel G.M. Grange a formulé, dans son rapport, un certain nombre de recommandations, en vue de rendre plus sûr le transport de marchandises dangereuses par chemin de fer; et

ATTENDU que le Comité des transports par chemin de fer examine actuellement ces recommandations, qui relèvent de sa compétence; et

ATTENDU que la troisième recommandation se lit comme il suit:

> "Un train de marchandises dangereuses qui ne satisfait pas à la première recommandation ne devrait pas dépasser 4 000 pieds de longueur, nonobstant la protection offerte par le détecteur de boîte chaude.
>
> Si le train de marchandises dangereuses ne satisfait pas à la première recommandation, ou si le parcours qu'emprunte le train de marchandises à travers les zones habitées ne satisfait

a built-up area does not comply with Recommendation Two, the train in passing through the built-up area should not exceed 25 miles per hour."

IT IS HEREBY ORDERED THAT:

Canadian Pacific Limited
is required to show cause on or before February 9, 1981, why the Railway Transport Committee should not, effective February 12, 1981, order that:

1. If a train transporting any commodities regulated under the Regulations for the Transportation of Dangerous Commodities by Rail (hereinafter called the "Red Book") has:

(a) any cars in it without roller bearings;

(b) any tank cars carrying any commodity regulated under the Red Book that does not have double shelf couplers;

(c) any specification 112 or 114 tank cars carrying any commodity regulated under the Red Book that does not have head shields and thermal protection; or

(d) any 111 or 114 tank cars carrying any commodity regulated by the Red Book which have bottom fittings without bottom fitting protection;

the train shall not exceed 4000 feet in length.

2. If a train transporting any commodity regulated under the Red Book meets any of conditions (a) to (d) specified in clause 1, the train shall not exceed twenty-five

pas à la deuxième recommandation, ce train ne devrait pas dépasser 25 milles à l'heure quand il traverse la zone en question."

IL EST PAR LA PRESENTE ORDONNE CE QUI SUIT:

Canadien Pacifique Limitée
sont sommés d'exposer, au plus tard le 9 février 1981, les motifs pour lesquels le Comité des transports par chemin de fer ne devrait pas prescrire, dès le 12 février 1981, l'application de ce qui suit:

1. Ne doit pas dépasser 4 000 pieds de longueur, un train transportant des marchandises dangereuses assujetties aux dispositions du Règlement sur le transport des marchandises dangereuses par chemin de fer (ci-après désigné le "Livre rouge" (Red Book),

a) dont les wagons ne sont pas munis de roulements à rouleaux;

b) dont les wagons-citernes n'ont pas d'attelages à double plateau;

c) dont les wagons-citernes 112 ou 114 ne sont pas dotés de déflecteurs et d'une protection thermique;

d) dont les wagons-citernes 111 ou 114 munis d'un dispositif de vidange par le bas ne sont pas équipés d'une protection dudit dispositif.

2. Un train qui transporte des marchandises assujetties aux dispositions du Livre rouge et qui répond à l'une des conditions exposées de a) à d) à la clause n° 1 ne doit pas dépasser 25 milles à

miles per hour while passing through any centre of population containing 500 or more people in proximity to the track.

3. If a train transporting any commodity regulated under the Red Book:

(a) passes through a centre or population containing 500 or more people in proximity to the track, and

(b) the track through such centre of population does not have hot box and dragging equipment detectors installed at least every twenty miles,

the train shall not exceed twenty-five miles per hour while passing through the centre of population.

l'heure lorsqu'il traverse une agglomération de 500 habitants ou plus vivant à proximité de la voie ferrée.

3. Si un train transportant des marchandises assujetties aux dispositions du Livre rouge

a) traverse une agglomération de 500 habitants ou plus vivant à proximité de la voie ferrée, et

b) que cette voie n'est pas protégée par un détecteur de boîte chaude et de pièces traînantes posés à tous les vingt milles,

ce train ne doit pas dépasser vingt-cinq milles à l'heure lorsqu'il traverse l'agglomération en question.

J. O'Hara

Secretary
Railway Transport Committee

Secrétaire
Comité des transports par chemin de fer

APPENDIX 2

RAILWAYS UNDER CTC JURISDICTION WHO RECEIVED "SHOW CAUSE" ORDERS

Railway	Order Number	Date
Algoma Central Railway	R-31782	26/1/81
Arnaud Railway Company	R-31783	26/1/81
Burlington Northern Inc.	R-31784	26/1/81
Burlington Northern (Manitoba) Ltd.	R-31785	26/1/81
Canada Southern Railway Company	R-31786	26/1/81
Canadian National Railway	R-31780	26/1/81
Canadian Pacific Limited	R-31781	26/1/81
Devco Ralway	R-31787	26/1/81
Chesapeake & Ohio Railway Company	R-31788	26/1/81
Consolidated Rail Corporation	R-31789	26/1/81
Detroit River Tunnel Company	R-31790	26/1/81
Essex Terminal Railway Company	R-31791	26/1/81
Lake Erie and Detroit River Rly. Co.	R-31792	26/1/81
Maine Central Railroad Company	R-31793	26/1/81
Napierville Junction Railway Company	R-31794	26/1/81
Norfolk and Western Railway Co.	R-31795	26/1/81
Nipissing Central Railway	R-31796	26/1/81
Quebec North Shore and Labrador Rly.	R-31797	26/1/81
St. Lawrence and Adirondack Railway Co.	R-31798	26/1/81
Toronto Hamilton and Buffalo Railway Co.	E-31799	26/1/81
Toronto Terminals Railway Co.	R-31800	26/1/81
Wabush Lake Railway Company	R-31801	26/1/81
White Pass and Yukon Route	R-31802	26/1/81

APPENDIX 3

LIST NO.1

Commodity Name

Amatol (high explosives)
Anhydrous Ammonia
Anhydrous Hydrofluoric Acid
Chlorine
Isobutane or Liquified Petroleum Gas
Liquified Petroleum Gas
Motor Fuel Antiknock Compound
Propane or Liquified Petroleum Gas
Sulphur Dioxide
Vinyl Chloride
Acrylonitrile
Ammunition for cannon with explosive projectiles
Butadiene, Inhibited
Ethylene Oxide
High Explosives
High Explosives Liquid
Hydrochloric Acid Anhydrous, Hydrogen Chloride
Phosphorus White or Yellow in water
Ammunition for cannon illuminating projectiles
Ammunition for cannon with smoke projectiles
Ammunition for small arms with explosive projectiles
Aqua Ammonia Solution
Blasting caps-more than 1000
Calcium Phosphide
Calcium Cyanide
Carbon Monoxide
Crude Nitrogen Fertilizer Solution
Compressed Gases n.o.s.
Cyanide of Potassium, Liquid
Cyanide of Sodium, Liquid (Sodium Cyanide)
Cyanide of Sodium, Solid (Sodium Cyanide)
Detonating Fuses Class A
Detonating Primers
Detonating Fuses Class A explosives, radioactive
Dimethylamine Anhydrous
Diphenylamine chlorarsine, Gas Liquid or solid
Electric Blasting Caps more than 1000
Ethane
Ethylene
Explosive Bomb
Explosive Mine
Explosive Projectile
Explosive Torpedo
Fertilizer Ammoniating Solution containing free ammonia

LIST 1 (cont'd)

Commodity Name

Fuses Detonating Containing Class A explosives
Hand Grenades
Hydrocarbon Gas, Liquified
Hydrocyanic Acid, Liquified
Hydrocyanic Acid (Prussic), Liquid
Hydrogen Sulphide
Isobutylene or Liquified Petroleum Gas
Jet Thrust Unit (JATO), Class A Explosives
Low Explosives
Methane
Methylamine Anhydrous
Nonliquified Hydrocarbon Gas
Oleum
Oxygen Pressurized Liquid
Propellant Explosives Class A
Pyroforic Liquids, n.o.s.
Radioactive material low specific activity
Rocket Ammunition with explosive projectiles
Silver Cyanide
Sodium Metallic

LIST 2

Commodity Name

Acetone Cyanhydrin
Acid Picric
Ammonium Picrate
Ammunition Chemical
Ammunition for Cannon with Gas Projectiles
Ammunition for Cannon with Incendiary Projectiles
Ammunition for Small Arms with Incendiary Projectiles
Barium Cyanide, Solid
Black Blasting Powder
Black Pellet Powder
Black Powder
Blasting Caps with metal clad mild detonating fuse-more than 1000
Blasting Caps with safety fuse-more than 1000
Boosters, explosive
Bromacetone, Liquid
Brombenzyl Cyanide, Liquid
Bromine
Bromine Pentafluoride
Bromine Trifluoride
Bursters, explosives
Calcium Phosphide
Choracetophenone Gas, liquid or solid
Chlorpicrin and Non-flammable nonliquified compressed gas mixtures
Chlorpicrin and methyl chloride mixtures
Compressed Gases, n.o.s.
Copper Cyanide
Crotonaldehyde
Cyanides of Cyanide mixtures, dry
Cyanide of Potassium, Solid
Cyanogen Bromide
Cyanogen Chloride containing less than .9% water
Cyanogen Gas
Cyclopropane
Explosives radioactive
Dimethyl Ether
Dephenyl chlorarsine Solid
Diphosgene
Ethyldichloroarsine
Fluorine
Hexaethyl Tetraphosphate and compressed gas mixture
Hydrobromic Acid
Hydrobromic acid, anhydrous
Hydrocyanic acid, solutions
Hydrogen hydrofluoric and sulphuric acids, mixtures
Hydrogen Bromide
Hydrogen gas, nonliquified
Hydrogen, Liquified
Ignitors Jet Thrust (JATO)

LIST 2 (cont'd)

Commodity Name

Class A explosives
Ignitors Rocket Motor
Class A Explosives
Igniting Explosives
Irritating Agents n.o.s.
Lead Cyanide
Lewisite
Liquified Hydrocarbon gas
Liquified Non flammable gases charged with nitrogen, carbon dioxide or air
Low blasting explosives
Mercuric Chloride
Mercuric Cyanide Solid
Methyldichlorasine
Methyl Mercaptan
Monochloracetone Stabilized
Mustard Gas
Nitrating (mixed) Acid
Nitric Oxide
Nitrogen fertilizer, solution
Nitrogen Tetroxide, Liquid
Nitrogen Tetroxide - Nitric Acid mixtures containing up to 33.2% weight Nitric Oxide
Nitroglycerin, Spirits of
Nitrosyl Chloride
Nitrous Oxide
Organic Phosphates n.o.s. mixed with compressed gas
Pentaborane
Perchlorates n.o.s.
Perchloric acid, not in excess of 72%
Phenycarbylamine Chloride
Phenydichlorarsine, Liquid
Phosgene (disphosgene)
Phosphorus, white or yellow, dry
Poisonous Liquid or Gas n.o.s.
Police Grenades Poison Gas Class A
Pyro Sulphuryl Chloride
Radioactive Material, exempt Articles, exempt quantity, fissile, normal form
Radioactive Material Special Form
Rifle Grenades
Rocket Ammunition with illuminating projectiles
Rocket Ammunition with gas projectiles
Rocket Ammunition with incendiary projectiles
Rocket Ammunition with smoke projectiles
Rocket Motors Class A Explosives
Silicon Tetrafluoride
Sulphur Hexafluoride
Sulphur Trioxide Stabilized
Sulphuryl Chloride
Sulphuryl Fluoride

LIST 2 (cont'd)

Commodity Name

Supplementary Charges (explosive)
Tear Gas Candles
Tear Gas Grenades
Tear Gas Material Liquid, or Solid n.o.s.
Tetraethyl Dithio Pyrophosphate and compressed gas mixture
Tetraethyl Pyrophosphate and compressed gas mixture
Tetrafluoroethylene, Inhibited
Tetranitromethane
Trimethylamine Anhydrous
Trinitrobenzene, wet (not to exceed 16 ounces)
Vinyl Fluoride, Inhibited
Vinyl Methyl Ether, Inhibited
Xylyl Bromide
Zinc Cyanide

APPENDIX 4

CENSUS METROPOLITAN AREAS*

St. John's, Newfoundland	145,400
Halifax, Nova Scotia	267,991
Saint John, New Brunswick	112,974
Chicoutimi, Quebec	128,643
Quebec, Quebec	542,158
Trois Rivieres, Quebec	106,031
Montreal, Quebec	2,802,547
Ottawa/Hull, Ontario/Quebec	693,288
Oshawa, Ontario	135,196
Toronto, Ontario	2,803,101
Hamilton, Ontario	529,371
St. Catharines, Ontario	301,921
Kitchener, Ontario	272,158
London, Ontario	270,383
Windsor, Ontario	247,582
Sudbury, Ontario	157,030
Thunder Bay, Ontario	119,253
Winnipeg, Manitoba	578,217
Regina, Saskatchewan	151,191
Saskatoon, Saskatchewan	133,793
Calgary, Alberta	471,397
Edmonton, Alberta	556,270
Vancouver, British Columbia	1,166,348
Victoria, British Columbia	218,250

* CMA Refers to the main labour market area of an urbanized core (or continuously built-up area) having 100,000 or more population. CMAs are created by Statistics Canada and are usually known by the name of the urban area forming their urbanized core. They contain whole municipalities (or census subdivisions). CMAs are comprised of (1) municipalities completely or partly inside the urbanized core, and (2) other municipalities, if (a) at least 40% of the employed labour force living in the municipality works in the urbanized core, or (b) at least 25% of the employed labour force working in the municipality lives in the urbanized core.

Since a CMA must contain whole census subdivisions, its limits may fall within, or extend beyond, the actual labour market area. The differences may be significant in those parts of Canada where census subdivisions cover particularly large areas of land. Census metropolitan areas may also differ from Metropolitan Areas designated by local authorities for planning or other purposes.

Appendix 5

RAILWAY TRANSPORT COMMITTEE

ORDER NO. R-32284

May 28, 1981

IN THE MATTER OF the protection and safety of the public and of employees in the running and operating of trains; and

IN THE MATTER OF a public hearing being held to consider and hear submissions on certain recommendations contained in the Report of the Mississauga Railway Accident Inquiry.

File No. 50076.1

WHEREAS the Railway Transport Committee has heard certain evidence related to hot box detectors and their role in preventing train derailments due to overheated bearings;

WHEREAS Canadian Pacific Limited presently plans to install 154 hot box detectors between 1981 and 1985;

WHEREAS Canadian Pacific Limited has agreed that it is possible to install those 154 hot box detectors by the end of 1983;

WHEREAS Canadian Pacific Limited presently has fewer hot box detectors installed on its lines than Canadian National Railways; and

WHEREAS the Railway Transport Committee has determined that it is in the public interest that more hot box detectors be installed on the railway lines of Canadian Pacific Limited -

COMITE DES TRANSPORTS PAR CHEMIN DE FER

ORDONNANCE Nº R-32284

Le 28 mai 1981

RELATIVE à la protection et la sécurité du public et des employés de chemins de fer dans l'exploitation des trains; et

RELATIVE à l'audience publique tenue présentement aux fins d'entendre les témoignages visant certaines recommandations du Rapport d'enquête sur l'accident ferroviaire de Mississauga.

Dossier nº 50076.1

ATTFNDU que le Comité des transports par chemin de fer a entendu certains témoignages visant les détecteurs de boîtes chaudes et leur rôle dans la prévention de déraillements causés par des coussinets surchauffés;

ATTENDU que Canadien Pacifique Limitée projette d'installer 154 détecteurs de boîtes chaudes entre 1981 et 1985;

ATTENDU que Canadien Pacifique Limitée est d'accord qu'il est possible de compléter l'installation des 154 détecteurs de boîtes chaudes pour la fin de 1983;

ATTENDU que le réseau de Canadien Pacifique Limitée compte présentement moins de détecteurs de boîtes chaudes que celui des Chemins de fer Nationaux du Canada; et

ATTENDU que le Comité des transports par chemin de fer a établi que dans l'intérêt du public, un plus grand nombre de détecteurs de boîtes chaudes doit être installé sur les voies ferrées de Canadien Pacifique Limitée -

ORDER NO. R-32284

IT IS HEREBY ORDERED THAT:

In addition to the hot box detectors installed on its lines prior to January 1, 1981, Canadian Pacific Limited shall install 154 more hot box detectors before December 31, 1983.

ORDONNANCE N° R-32284

IL EST PAR LES PRESENTES ORDONNE CE QUI SUIT:

Canadien Pacifique Limitée devra installer, avant le 31 décembre 1983, 154 détecteurs de boîtes chaudes supplémentaires en sus de ceux qui ont été installés sur ses lignes avant le 1er janvier 1981.

(signed) (signature)
J. O'Hara
Secretary Secrétaire
Railway Transport Committee Comité des transports par chemin de fer

APPENDIX 6

RAILWAY TRANSPORT COMMITTEE

ORDER NO. R-30031

November 27, 1979

IN THE MATTER OF Section 48 of the National Transportation Act and Section 227 of the Railway Act.

IN THE MATTER OF a proposed investigation by the Railway Transport Committee into all matters pertinent to the derailment of Canadian Pacific Limited Train No. 54 at 23:55 on November 10, 1979, at mileage 17.0 of the Galt Subdivision in Mississauga, Ontario.

IN THE MATTER OF the Show Cause Order issued on November 16, 1979, concerning proposed interim safety measures.

File No. DC 2.6

WHEREAS replies to the said Show Cause Order were received by the Railway Transport Committee;

WHEREAS the proposed hearing of the Railway Transport Committee is to be replaced by a wider-ranging public inquiry conducted by the Minister of Transport pursuant to the Inquiries Act;

WHEREAS the Railway Transport Committee has determined that certain interim safety measures must be undertaken pending the outcome of the findings of any public inquiry into the subject matter.

COMITE DES TRANSPORTS PAR CHEMIN DE FER

ORDONNANCE N° R-30031

Le 27 novembre 1979

RELATIVE à l'article 48 de la Loi nationale sur les transports et à l'article 227 de la Loi sur les chemins de fer.

RELATIVE à une enquête projetée par le Comité des transports par chemin de fer sur les questions pertinentes au déraillement du train n° 54 de Canadien Pacifique Limitée à 23 h 55 le 10 novembre 1979, au point milliaire 17.0 de la subdivision Galt, à Mississauga (Ontario).

RELATIVE à l'ordonnance en non-lieu émise le 16 novembre 1979, proposant des mesures provisoires de sécurité.

Dossier n° DC 2.6

ATTENDU que le Comité des transports par chemin de fer a reçu des commentaires en réponse à ladite ordonnance de non-lieu;

ATTENDU que l'audience projetée par le Comité des transports par chemin de fer sera remplacée par une enquête publique de plus grande envergure, laquelle sera présidée par le ministre des Transports en vertu de la Loi sur les enquêtes;

ATTENDU que le Comité des transports par chemin de fer a déterminé que certaines mesures provisoires de sécurité s'imposent en attendant les résultats de toute enquête publique concernant l'affaire précitée.

ORDER NO. R-30031

IT IS HEREBY ORDERED THAT:

1. Canadian Pacific Limited is not required to undertake the measures proposed in the above-mentioned Show Cause Order dated November 16, 1979.

2. In addition to marshalling requirements specified under section 74.589 of the Canadian Transport Commission Regulations for the Transportation of Dangerous Commodities by Rail, Canadian Pacific Limited shall marshall tank car shipments so that flammable compressed gases are separated from tank car shipments of chlorine, anhydrous ammonia or sulphur dioxide by at least 5 (five) non-placarded rail cars which are not listed in section 74.589 (j) of the Regulations for the Transportation of Dangerous Commodities by Rail.

ORDONNANCE N° R-30031

IL EST PAR LA PRESENTE ORDONNE QUE:

1. Canadien Pacifique Limitée n'est pas tenue de mettre en vigueur les mesures provisoires de sécurité proposées dans l'ordonnance en non-lieu susmentionnée, datée le 16 novembre 1979.

2. Outre les exigences de triage stipulées à l'article 74.589 des Règlements régissant le transport de marchandises dangereuses par chemin de fer de la Commission canadienne des transports, Canadien Pacifique Limitée devra disposer les wagons-citernes de façon à ce que ceux contenant des gaz comprimés inflammables soient séparés de ceux contenant du chlore, de l'ammoniac anhydre ou du bioxyde sulphurique, sur une distance d'au moins 5 (cinq) wagons non-étiquettés ne figurant pas sur la liste portée à l'article 74.589 (j) des Règlements régissant le transport des marchandises dangereuses par chemin de fer.

(signed) (signature)
J. O'Hara
Secretary Secrétaire
Railway Transport Committee Comité des transports par chemin de fer